

Transformation of organosulfur ...

S/081/62/000/010/045/085  
B168/B180

of the decomposition processes. [Abstracter's note: Complete  
translation.]

Card 2/2

S/081/62/000/005/040/112  
B151/B101

AUTHORS: Tits-Skvortsova, I. N., Rybnikova, A. A., Kuvshinova, N. N.

TITLE: Transformation of  $\alpha$ -decylthiophane in the presence of an aluminosilicate catalyst.

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 5, 1962, 264, abstract 5Zh238 (Sb. "Khimiya seraorgan. soyedineniy, soderzhashchikhsya v neftyakh i nefteproduktakh. v. 4". M., Gostoptekhnizdat, 1961, 136-140)

TEXT: The reaction between furfural and  $C_9H_{19}MgBr$  is used to obtain  $\alpha$ -nonylfurylcarbinol (I) (here and later the calculated yields in %, b. p. in  $^{\circ}C/mm$  Hg, m. p. in  $^{\circ}C$ ,  $n_D^{20}$  and  $d_4^{20}$ ): 76, 144-145/5, 3.9, 1.4665, 0.9326; by the action of  $HCl$  and  $C_2H_5OH$  I is converted to the ethyl ester of  $\alpha$ -keto-tetradecanic acid (II), 35, 142-144/3, 17, 1.4508, 0.9227; by the reduction of II with  $LiAlH_4$  tetradecandiol-1,4 (III) is

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Transformation of  $\alpha$ -decylthiophane ...

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obtained: 73-98, 172-174/5, 57.3, -, -; by the reduction with HBr gas III is converted to 1,4-dibromo-tetradecane (IV), 70, 182-184/9, -, 1.4857, 1.2174; by the reaction of IV with  $\text{Na}_2\text{S}$   $\alpha$ -decylthiophane (V) is obtained: 75-80, 148.5-149/5.5, -, 1.4804, 0.8959; the complex with  $\text{HgCl}_2$  has a m. p. 47.5°C. The contact conversion of V on an aluminosilicate catalyst (ASC) is studied. V is passed with a volume rate of 0.3  $\text{hrs}^{-1}$  over ASC (73.3% ASC on the wt. of V) in a stream of  $\text{N}_2$  at 300°C.  $\text{H}_2\text{S}$  is obtained in a yield of 53.7% (on the S content in V) and tetradecene-1,  $\text{C}_{14}\text{H}_{28}$ , b. p. 80-82°/8 mm Hg,  $n_D^{20}$  1.4383,  $d_4^{20}$  0.7841. [Abstracter's note: Complete translation.]

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TITS-SKVORTSOVA, I.N.; RYBNIKOVA, A.A.; KUVSHINOVA, N.N.

Synthesis and catalytic conversions of  $\alpha$ -decylthiophane over an  
aluminosilicate catalyst. Zhur.ob.khim. 30 no.10:3316-3319 0 '61.  
(MIRA 14,14)

1. Moskovskiy gosudarstvennyy universitet.  
(Thiophene)

KUVSHINOVA, O. P.

ALTERGOT, V. F., LAVYCHINA, K. S., and KUVSHINOVA, O. P. "Destructive Changes of the Protoplasm in the Course of Lysis in the Species *Fusarium*," Comptes Rendus (Doklady) de l'Academie des Sciences de l'URSS, vol. 31, no. 3, 1941, pp. 286-289.

511 P444

SO: SIRA, SI 90-13, 15 Dec. 1953

KUVSHINOVA, O. P.

KUVSHINOVA, O. P.: "The effect of various granule dimensions of superphosphate, alone and in combination with humus, on the harvest of agricultural crops". Moscow 1955. All-Union Sci Res Inst of Fertilization, Agricultural Engineering, and Soil Science. (Dissertations for the degree of Candidate of Agricultural Science.)

SO: Knizhnaya Letopis' No. 50 10 December 1955. Moscow.



ORIGINAL :  
CULTURE : CULTIVATED PLANTS.

ABST. JOUR. : REF. ZHUR. : BIOLOGIYA, NO. 4, 1959,

NO. 15648

AUTHOR :  
TITLE :

ORIG. FILE :

ABSTRACT : control. The absence of effect from ix is associated by the author with the harmful effect of chlorine. In recent years (1955-1956), the main attention was devoted to the row placement of fertilizers, organo-mineral mixtures and phosphorite compost. Phosphorus and nitrogen fertilizers in a 1:200:15 dose in rows gave high crop gains and with joint placement considerably increased the effect of small doses (2 tons/hectare) of

CARD: 2/3

57

CULTIVATED PLANTS.

ABST. JOUR. : REF. ZHUR. : BIOLOGIYA, NO. 4, 1959,

NO. 15648

AUTHOR :  
TITLE :

ORIG. FILE :

ABSTRACT : organic fertilizers. Phosphorite meal, composted with manure in a 1:20 ratio in a 1.25 tons/hectare dose gave approximately 3 tons/hectare larger crop of potatoes than when mixed with manure on the day of placement -- V. V. Prokoshin

CARD: 3/3



KUVSHINOVA, (I.P., kand.sel'skokhozyaystvennykh nauk

Methods of applying various fertilizers to corn at the time  
of planting. Uch. zap. Mord. gos. un. no.13:66-69 '60.  
(MIRA 15:11)

1. Kafedra pochvovedeniya i agronomii Mordovskogo  
gosudarstvennogo universiteta.  
(Corn (Maize)—Fertilizers and manures)

KORABITSKIY, N.K., kand.sel'skokhoz.nauk; KUDYUMOVA, G.P., kand.sel'skokhoz.  
nauk

Manure-soil composts in the leached Chernozems of the Mordovian A.S.S.R.  
Zemledelie 25 no.9:67-68 S '63. (MIRA 16:9)

1. Mordovskiy gosudarstvennyy universitet.  
(Mordovia—Compost)

SHISHKINA, A.V.; KUVSHINOVA, R.L.

Clinical aspects of craniospinal tumors. Zhur. nevr. i psikh. 61  
no.4:501-503 '61. (MIRA 14:7)

1. Klinika nervnykh bolezney (zav. kafedroy - dotsent Ye.N.Kovalev)  
Ryazanskogo meditsinskogo instituta imeni I.P.Pavlova i oblastnaya  
bol'nitsa imeni N.A.Semashko (glavnyy vrach B.N.Shirokov).  
(NERVOUS SYSTEM—TUMORS)

L 59234-65 EWT(1)/EWT(m)/EPF(c)/EPR/T/ENP(t)/ENP(b)/ENA(h) Pz-6/Pr-4/Pa-4/Peb  
 IJP(c) JD/JG/AT  
 ACCESSION NR: AP5015018

UR/0078/65/010/006/1507/1508  
 546.41'221

37  
 B

AUTHOR: Tananayev, I. V.; Kuvshinova, T. B.

TITLE: Reaction of GaS with gaseous ammonia at high temperatures

SOURCE: Zhurnal neorganicheskoy khimii, v. 10, no. 6, 1965, 1507-1508

TOPIC TAGS: <sup>27</sup>gallium nitride, <sup>27</sup>gallium sulfide, <sup>27</sup>ammonia, <sup>27</sup>semiconductor

ABSTRACT: The emissive properties of the semiconductor gallium nitride (GaN) are determined to a large extent by the temperature at which it is synthesized. In this connection, the authors propose a method for preparing GaN at relatively low temperatures (800 and 900C) by reacting GaS with dry ammonia, the reaction is



The products were stable in air at room temperature; at about 1000C, they formed gallium oxide. They did not react with water, hydrochloric or nitric acid, but dissolved on heating in concentrated alkalis and after prolonged boiling in dilute sulfuric acid. In order to make sure that the synthesized compound was gallium nitride, not gallium amide (GaNH), GaN was synthesized by the method of H. Hahn and R. Juza (Z. anorg. Chem., 244, 111, 1940).

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L 59234-65

ACCESSION NR: AP5015018

The x-ray diffraction patterns obtained for both products were identical. Orig. art. has:  
1 table and 1 formula.

ASSOCIATION: None

SUBMITTED: 19Oct64

ENCL: 00

SUB CODE: IC

NO REF SOV: 000

OTHER: 006

*dm*  
Card 2/2

Kuvshinova, V. A.

20-2-26/69

AUTHORS: Korobitsyna, I. K. , Zhukova, I. G. , Kuvshinova, V. A. ,  
Gaydamovich, N. N. , Yur'yev, Yu. K.

TITLE: Synthesis and Isomerization of Enol Acetates of  $\beta$ -Furanidons  
(Sintez i izomerizatsiya enolatsetatov  $\beta$ -furanidonov)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 111, Nr 2, pp. 527-530  
(USSR)

ABSTRACT: The derivatives of the enolic form of tetrahydrofuranon-3  
( $\beta$ -furanidon) and of its homologues have hardly been investigated at all. The authors of the paper under review, in order to produce the acetylic derivatives of the enolic form, used such ketones of the  $\beta$ -furanidon series in which only one single methylene group stands in the  $\alpha$ -position with respect to the carbonyl group. This made it possible to obtain only one enolic acetate with a position of the double bond that was known in advance. Isopropenylacetate was used as acetylating substance. So far, this type of the interesting  $\beta$ -furanidon derivatives has not been described.

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The authors of the paper under review examined the behavior

Synthesis and Isomerization of Enol Acetates of  $\beta$ -Furanidons

20-2-25/60

of these enolic acetates with respect to halogenation and isomerization. At chlorine blowing through 2,2,5,5-tetramethylfuranidon-3-enolacetate, or through its solution in chloroform or absolute ether, there is produced at  $-5^{\circ}$  a mono-chlorine-ketone of the furanidine series, i.e. 4-chlorine-2,2,5,5-tetramethylfuranidon-3. This reaction is of fundamental importance, but it has no preparational significance. One of the most interesting reactions is the isomerization of the thermal or catalytic enolacetate-ketone into  $\beta$ -diketones. If triborofluoride is let through cooled enolic acetate at  $-40$  to  $-20^{\circ}$ , no isomerization takes place. At  $-10$  to  $-5^{\circ}$ , on the other hand, after a certain period of induction a turbulent reaction takes place as well as a total resinification of the reaction mixture. If the same enolic acetate is let through a glass tube, which is filled with wadding of glass and heated up to a temperature of  $500^{\circ}$  (but not below) then an isomerization into 4-acetyl-2,2,5,5-tetramethylfuranidon-3 takes place. At higher temperatures the yield decreases from 36.5 % to 5 - 10 %. As a matter of fact, it is split into a ketone and a ketene. The production of a cupric salt and of the derivatives of the 4-acetyl-2,2,5,5-tetramethyl-

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25-2-26/60

• Synthesis and Isomerization of Enol Acetates of  $\beta$ -Furanidons

furanidon-3 as well as an intense violet coloring by solution of ferric chloride confirm its structure. The spectrum of absorption of this cupric salt is analogous to the spectrum of absorption of the cupric salt of acetylacetone, which is one of the characteristic  $\beta$ -diketones. The experimental part of the paper under review describes in detail the reactions together with yields, constants and methods. There are 6 references, 2 of which are Soviet.

ASSOCIATION: Moscow State University imeni M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova)

PRESENTED: January 16, 1957, by B. A. Kazanskiy, Member of the Academy

SUBMITTED: January 12, 1957

AVAILABLE: Library of Congress

Card 3/3



LEVIN, A.M.; SMIRNOV, V.A.; CHERKASOVA, A.Ya.; KOVSFINOVA, V.I.

Using electronic computers for calculating multicircular urban gas  
systems. Gaz. prom. 6 no.11:33-34 '61. (MIRA 15:1)  
(Gas distribution) (Electronic calculating machines)

KUVSHINOVA, Ye.V.

Production of a specific antiserum against potato virus S. Vop.  
virus 8 no.2:172-174 Mr-Ap'63 (MIRA 16:12)

Production of antiserum against barley false stripe virus.  
Ibid.: 174-176

1. Vsesoyuznyy nauchno-issledovatel'skiy institut fitopatologii.

SOCHILOVA, A.A.; BUYANOVSKAYA, I.S.; KENINA, A.Ye.; DMITRIYEVA, V.S., FURER,  
N.M.; BELIAYEVA, L.A.; KUVSHINOVA, Ye.V., VAKULENKO, N.A.; ZAMUKHOV-  
SKAYA, A.N.; LEONOVA, A.G.

Agar diffusion method for determining the activity of antibiotics.

Trudy VNIIA no.1:10-26 '53.

(MLRA 8:1)

(Antibiotics--Testing) (Bacteriology--Culture and culture media)

COUNTRY : USSR  
 CATEGORY : Plant Diseases. General Problems. 0  
 RES. JOUR. : Zhurnal., No. 23 1958 No. 10, 1962  
 AUTHOR : Kuvshinova, Ye. V.  
 INST. : ~~Moscow Agricultural Academy~~ Academy imeni K. A. Timiryazev  
 TITLE : The Use of Dry Serums in Phytopathology.  
 ORIG. PUB. : Dokl. Mosk. s.-kh. akad. im. K. A. Timiryazeva, 1957, v. 91, 162-166  
 ABSTRACT : The feasibility of using dry serums in diagnosis of certain bacterial and virus diseases was studied. Prepared and studied were serums specific against Pseudomonas turfaciens, Anthracnose vesicatorum and B. myriod, the virus of tobacco mosaic and against X virus of potato. Dilution of anti-bacterial serums was 1:80; dilution of anti-virus ones - 1:8. Serums were diluted with distilled water, physiological solution, 1% glucose, 0.1% gelatine plus 1% glucose. The diluted serums were applied onto photographic film from which emulsion had been washed off.

CARD: 1/2

COUNTRY :  
CATEGORY :

C

REF. JOUR. : RZhBiol., No. 1958 No. 104562

AUTHOR :  
INST. :  
TITLE :

ORIG. PUB. :

ABSTRACT : and dried at room temperature. The activity of the serum was checked once a month. Control consisted of normal serum on the same kind of film and the same liquid serum kept at 4-5°. Serums, both anti-bacterial and anti-virus, diluted in physiological solution and distilled water, preserved their activity for 3-4 months. Serums diluted with 1% glucose solution preserved their activity longer.  
--G. A. D'yakova

CARD: 2/2

3

KUVSHINSKIY, D.D. - general-mayor meditsinskoy sluzhby

Organization of the work of specialists in military and medical  
institutions. Voen.-med. zhur. no.8:17-21 Ag '61. (MIRA 15:2)  
(MEDICINE, MILITARY)

KUVSHINSKIY, D.D., general-mayor meditsinskoy sluzhby

Important problems of the military medical service. Voen.-med.  
zhur. no.11:3-7 N '61. (MIRA 15:6)

(MEDICINE, MILITARY)

KUVSHINSKIY, D.D., general-leutenant meditsinsky sluzhby

Improve medical care and increase the combat readiness of the medical  
serv co. Voen.-med.zhur. no.1:3-8 '65.

(MIRA 18:10)



KUCHINSKIY, D.D., general-leutenant military doctor.

Some results of the work and problems of military medical  
service. Voer.-med. zhur. no. 1:3-6, Jan '66 (MMA 1966)

ACC NR: AP7002308

SOURCE CODE: 01/013/66/000/006/0128/0128

AUTHOR: Borchaninov, G. S.; Sokolov, N. I.; Vasil'yev, A. A.; Tarashov, V. I.;  
Grudinskiy, P. G.; Ul'yanov, S. A.; Kuvshinskiy, N. N.; Fedoseyev, A. M.

ORG: none

TITLE: L. N. Baptidanov (Deceased)SOURCE: IVUZ. Energetika, no. 6, 1966, 128

TOPIC TAGS: electric engineering personnel, academic personnel

ABSTRACT: L. N. Baptidanov died January 13, 1966. His working life was primarily dedicated to training of electrical engineering specialists. Soon after graduating from the Electrical Industrial Faculty of the Moscow Institute of the National Economy, Baptidanov began teaching at the Moscow Power Technical School. In 1934, Baptidanov began teaching at the All Union Correspondence Industrial Institute, then in 1946 he shifted to the All Union Industrial Academy of Machine Building, where he worked in the chair of electrical power stations. He was responsible for the creation of a model electrical station in the electrical stations chair of the Moscow Power Institute. Baptidanov was also very active as an author, writing such works as "Industrial Enterprise Substations", "Electrical Equipment of Electrical Stations and Substations", etc. From 1943 to 1946, Baptidanov worked as the Scientific editor for Electrical engineering at the State Power Literature Publishing House. [JPRS: 37,564]

SUB CODE: 09 / SUBM DATE: none

Card 1/1

POLEYES, Miriam Ezrovna; KUVSHINSKIY, M.N., red.; BALDINA, N.F.,  
tekhn.red.

[Laboratory practice in analytical chemistry] Rukovodstvo  
k prakticheskim zaniatiyam po analiticheskoi khimii. Moskva,  
Medgiz, 1962. 71 p. (MIRA 15:4)  
(Chemistry, Analytical—Laboratory manuals)

SHILOV, Yu.M.; TARASENKO, M.I.; KUVSHINSKIY, M.N., red.; KOKIN, N.M.,  
tekhn. red.

[General chemistry] Obshchaya khimiya. Moskva, Nedgiz, 1963.  
367 p. (NIA 16:12)  
(Chemistry--Handbooks, manuals, etc.)

STEPANENKO, Boris Nikoalyevich; KUVSHINSKIY, M.N., red.; MIRONOVA,  
A.M.; tekhn. red.

[Organic chemistry] Organicheskaya khimiya. Izd.3., ispr.  
1 dop. Moskva, Medgiz, 1963. 411 p. (MIRA 16:5)  
(Chemistry, Organic)

NEMENOVA, Yu.M.; KRYUCHKOVA, G.M.; LITUBINA, A.Ya.; POLEYES, M.E.;  
KUVSHINSKIY, M.N., red.

[Manual on the technique of laboratory work] Fraktikum po  
tekhnike laboratornykh rabot. Moskva, Meditsina, 1965. 207 p.  
(MIRA 18:11)

GRUNDINSKIY, P.G., professor; KUVSHINSKIY, N.M., dotsent, kandidat  
tekhnicheskikh nauk; SEMENOV, S.W., inzhener; BUGRIMOV, Ye.A.,  
inzhener.

Remarks on L.D.Dvoskin's article "New scheme and construction  
of the distributing system of an electric power station."  
Elektrichestvo no.6:86-88 Je '54. (MLRA 7:7)

1. Moskovskiy energoicheskoy institut im. Molotova (for Grun-  
dinskiy, Kuvshinskiy) 2. Mosenergoprojekt (for Semenov, Bugri-  
nov)

(Dvoskin, L.D.) (Electric power stations)

UGORETS, I.I.; GLAZUNOV, A.A.; SYROMYATNIKOV, I.A.; KASHUMIN, I.S.; POSTNIKOV,  
N.A.; RADTSIG, V.A.; UL'YANOV, S.A.; GRUDINSKIY, P.G.; VASIL'YEV, A.A.;  
KUVSHINSKIY, M.M.; BAPTIDANOV, L.N.; TARASOV, V.I.; KRIKUNCHIK, A.B.;  
SHAPIRO, A.B.; BIBIKOV, V.V.; DVOSHIN, L.I.; KLINGOF, I.D.; KARPOV,  
M.M.; USPENSKIY, B.S.; CHALIDZE, I.M.; BLOCH, Ya.A.; SHMOTKIN, I.S.

Iosif IAKovlevich Gumin; obituary. Blok.sta.26 no.12:58 D '55.  
(Gumin, Iosif IAKovlevich, 1890-1955) (MIRA 9:4)



VINTER, A.V.; NEKRASOV, A.M.; SYROMYATNIKOV, I.A.; VOZNESENSKIY, A.N.;  
VASILENKO, P.I.; LAUPMAN, P.P.; TERMAN, I.A.; VINOGRADOV, N.P.;  
ANTOSHIN, N.N.; ALEKSANDROV, B.K.; USPENSKIY, B.S.; KLASSON, I.R.;  
KHEMYFITS, M.E.; DRUTSKIY, V.P.; KRACHKOVSKIY, N.N.; POPOV, P.A.;  
CHELIDZE, I.M.; FILARETOV, S.N.; KOZLOV, M.D.; BERLIN, V.Ya.;  
SARADZHEV, A.Kh.; GORDZIYEVICH, I.S.; PAK, V.P.; DORFMAN, S.M.;  
DUBINSKIY, L.A.; UL'YANOV, S.A.; GRUDINSKIY, P.G.; KUVSHINSKIY, N.N.;  
ERMOLANKO, V.M.

Mikhail Mikhailovich Karpov. Elek.sta. 27 no.10:62 0 '56. (MLRA 9:12)  
(Karpov, Mikhail Mikhailovich, d.1956)

KUVSHINSKII, S. V.

Kuvshinskii, S. V., and Kuvshinskii, S. I.

The structure of the state. XIX. The structure of the state of the viscosity of liquids. J. Gen. Chem. (U.S.S.R.)

Vol. 1, 1934, pp. 2-9

Abstracted in: Chem. Abstr., Vol. 31, 1935

The law of viscosity is plotted as a function of the temperature for different substances: ethers, alcohols, glycerol, etc. The curves are of the type  $\eta = A \exp(B/T)$ , where  $\eta$  is the viscosity,  $A$  and  $B$  are constants. The values of  $A$  and  $B$  are calculated for the substances mentioned. The law of viscosity is also plotted for the products of the decomposition of the liquid. In a complete system the viscosity curve of the liquid changes (the temp. coeff.) to a viscosity of  $10^{-1}$  to  $10^{-2}$  times the value at the crit. temp., reverses to the opposite direction (i.e., temp. coeff. of viscosity is negative). It is believed possible to develop a general theory for all liquids.

KUVSHINIKY, V.V.

"Milling" (Frezerovanie), MASHGIZ, Sverdlovsk, 1953.

SO: D-70085, 24 Aug 1954.

KUVSHINSKIY, Vladimir Vladimirovich; TOLSTOV, M.A., redaktent; DUGINA,  
N.A. tekhnicheskiiy redaktor.

[Milling machinery] Frozeraye stanki. Moskva, Gos.nauchno-tekhn.  
izd-vo mashinostroitel'noi lit-ry, 1955. 62 p. (Nauchno-populiar-  
naia biblioteka rabochego stanochnika, no.24) (MLRA 9:1)  
(Milling machines)

KUVSHINSKIY, Vladimir Vladimirovich; LOSKUTOV, V.V., kandidat tekhnicheskikh nauk, retsentsent; BLANKMAN, M.A., inzhener, redaktor; DUGINA, N.A., tekhnicheskiiy redaktor.

[Milling] Frezerovanie. Moskva, Gos. nauchno-tekhnicheskoe izd-vo mashinostroitel'noi lit-ry, 1955.298 p. (MLRA 9:5)  
(Milling machinery)

KUVSHINSKIY, V.V., kandidat tekhnicheskikh nauk; SERODBENNIIK, Yu.B.,  
kandidat tekhnicheskikh nauk; SOLOVIN, I.S., kandidat  
tekhnicheskikh nauk; SHARIN, Yu.S., kandidat tekhnicheskikh  
nauk.

Surface formation and force relationships in large-feed  
semifinish grinding. Trudy Ural.politekh.inst. no.63:21-36  
'56. (MLRA 10:2)

(Surfaces (Technology)) (Grinding and polishing)

25(1,2)

PHASE I BOOK EXPLOITATION

SOV/1552

Kuvshinskiy, Vladimir Vladimirovich

Frezerovaniye (Milling Operations) 2nd ed., rev. and enl.  
Moscow, Mashgiz, 1958. 408 p. 45,000 copies printed.

Reviewer: V. T. Poluyanov, Engineer; Executive Ed. (Ural-Siberian Division, Mashgiz): L.A. Kon'shina, Engineer;  
Tech. Ed.: N.A. Dugina.

PURPOSE: The purpose of this book is to raise the qualifications of milling machine operators, and to improve their theoretical knowledge of the fundamentals of milling operations.

COVERAGE: The book deals with the basic principles and theories of milling operation and the tools and machinery used in the Soviet machine industry. The elements of cutting tools and principles of design are explained. Modern milling machines are reviewed and illustrated. The proper use of various types of machinery and the ways and means of increasing

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Milling Operations

SOV/1552

production are dealt with in several chapters. The book recommends material on the subject of milling operations, machinery and accessories, and problems of industrial planning. The chapters dealing with milling of grooves and keyways were written by Engineer G.P. Mostalygin. There are 39 Soviet references.

Table of Contents:

Foreword to the Second Edition	3
Introduction	5
Ch. I. Basic Information About Milling	16
Types of milling cutters	16
Geometric shape and the relief angle of teeth of a milling cutter	18
Elements of the cutting regime	25
Physical principles of the cutting process	29
Cutting force and power requirements in milling	39
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PHASE I BOOK EXPLOITATION

SOV/3872

Kuvshinskiy, Vladimir Vladimirovich

Frezerovaniye (Milling) 2nd ed., rev. Moscow, Mashgiz, 1959. 72 p. (Series: Nauchno-populyarnaya biblioteka rabochego-stanochnika, vyp. 15) 16,000 copies printed.

Executive Ed. (Ural-Siberian Division, Mashgiz): G.A. Sarafannikova;  
Tech. Ed.: N.A. Dugina.

**PURPOSE:** This booklet is intended for milling-machine operators studying to improve their skill.

**COVERAGE:** The booklet deals with the fundamentals of milling operations, the construction of milling cutters, and the efficient utilization of milling machinery. No personalities are mentioned. There are no references.

**TABLE OF CONTENTS:**

Introduction

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KONDASHEVSKIY, Vladislav Vladimirovich; KUVSHINSKIY, V.V., kand.tekhn.  
nauk, red.; MARCHENKOV, I.A., tekhn.red.

[Adjustment of automatic devices for controlling dimensions of  
parts in machining; design of devices and methods of their  
adjustment] Naladka avtomaticheskikh priborov kontrolya  
razmerov detalei pri mekhanicheskoi obrabotke; konstruktsei  
priborov i metody ikh naladki. Moskva, Gos.nauchno-tekhn.isd-vo  
 mashinostroit.lit-ry, 1960. 181 p. (MIRA 14:3)  
(Automatic control)

KUVSHINSKIY, V.V., dotsent, kand. tekhn. nauk; CHIHAN TSIK—JRI  
[Chang Ching-shih], aspirant

Surface roughness and dimensional precision of parts machined  
with cutters having trimming edges. Trudy Ural. politekh. inst.  
no.112:56-64, '61. (MIFA 16:7)

(Metal cutting)

KUVSHINSKIY, Vladimir Vladimirovich. Prinimal uchastiye SHUNAYEV,  
B.K., kand. tekhn. nauk, dots.; DRUGINA, N.A., tekhn.red.

[Fundamentals of the automation of technological processes in  
the machinery industry] Osnovy avtomatizatsii tekhnologicheskikh  
protssessov v mashinostroenii. Moskva, Mashgiz, 1962. 258 p.  
(MIRA 16:3)

(Machinery industry) (Automation)

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ABSTRACT AVAILABLE.

D-50054

HUTCHINGS, Yo. A., M. I. BERSHOV, G. A. LEBEDEV and G. N. LEBEDEV

"The Strength of Amorphous Bodies, Especially Polymers."

report presented at the Conference on Investigation of Mechanical Properties of Non-Metals, by the Intl. Society of Pure and Applied Physics and the AS USSR, at Leningrad, 19-24 May 1958.  
(Vest. Ak Nauk SSSR, 1958, no. 9, pp. 109-111)

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Electric conductivity of cellulose ethers. H. V. Kuvshinskii. J. Tech. Phys. (U. S. S. R.) 8, 634-44(1933). Acetyl, ethyl, nitro and benzyl cellulose derivs. were studied. H<sub>2</sub>O increases the cond. 10<sup>7</sup> times. Plasticizers increase it by the same amt. P. H. Rathmann

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ASAC-SLA METALLURGICAL LITERATURE CLASSIFICATION  
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Research on the amorphous state. III. Dielectric constants of amorphous substances in the softening interval. P. P. Kobeko and R. Kuyshinskii. *Physik. Z. Sowjetunion* 4, (1964) 104 (1964); cf. preceding abstr.—Brucine, phenolphthalein, cane sugar and 90% EtOH were studied in the temp. interval between the m. p. and the temp. of vitrification ( $T_g$ ). Changes in the static and dynamic polarization constants are associated with a change in the relaxation time, and with a change in the no. of rotating dipoles. This is explained by the loss in rotary motion of the mol. as  $T_g$  is approached. A departure from the Debye model above  $T_g$  is due to anisot. Below  $T_g$  the regular variation of the dielec. const. with frequency, which is analogous to that of compact cryst. bodies, cannot be connected with the internal friction. Dielec. loss below  $T_g$  is very low. Cond. is unaffected in this temp. region. In the region in which the static dielec. const. changed rapidly the potential distribution remained linear. IV. Electrical conductivity of mixtures in the softening interval. P. P. Kobeko and I. O. Nelidov. *Ibid.* 1965 712. — In amorphous substances and mixts., the elec. cond. and the temp.  $T$  are connected by the equation  $\log \sigma = (A - K) + (KT_g/T)$ , or  $\sigma = A e^{B/T}$ , where  $\sigma$  is the resistance,  $T_g$  is the temp. of vitrification, and  $A$ ,  $B$  and  $K$  are consts. Values of  $T_g$ ,  $A$ ,  $B$  and  $K$  are given for EtOH, glycerol, citric acid, sugar; molar mixts. of glycerol with EtOH, citric acid and sugar; 1 mol. of glycerol with 2 mole. EtOH; and for a mixt. of 3 components. The log  $\sigma$  plotted against  $(1/T_g - 1/T)10^4$  is linear for values of the second term between 0 and 1.2. The  $T_g$  of a mixt.

lies between that of its components. V. Relation between the temperature coefficient of the electrical conductivity and the viscosity in amorphous substances. *Ibid.* 715. — The relation between viscosity  $\eta$  and temp.,  $\log \eta = A' + B'/T$ , is linear and is similar to the relation between elec. cond. and temp. Values of  $T_g$ ,  $B$  and  $B'$  are given for 94% EtOH, PrOH, lutidine, 1:1 and 1:2 molar mixts. of glycerol and EtOH, tributyrin, citric acid, glycerol, glycerol-citric acid and glycerol-sugar solns., triacetin, Rochelle salts, betul, piperine, sugar + triacetin, Rochelle salts, betul, piperine, sugar + 10% H<sub>2</sub>O, rosin, salicin, brucine and phenolphthalein (Gerald M. Petty

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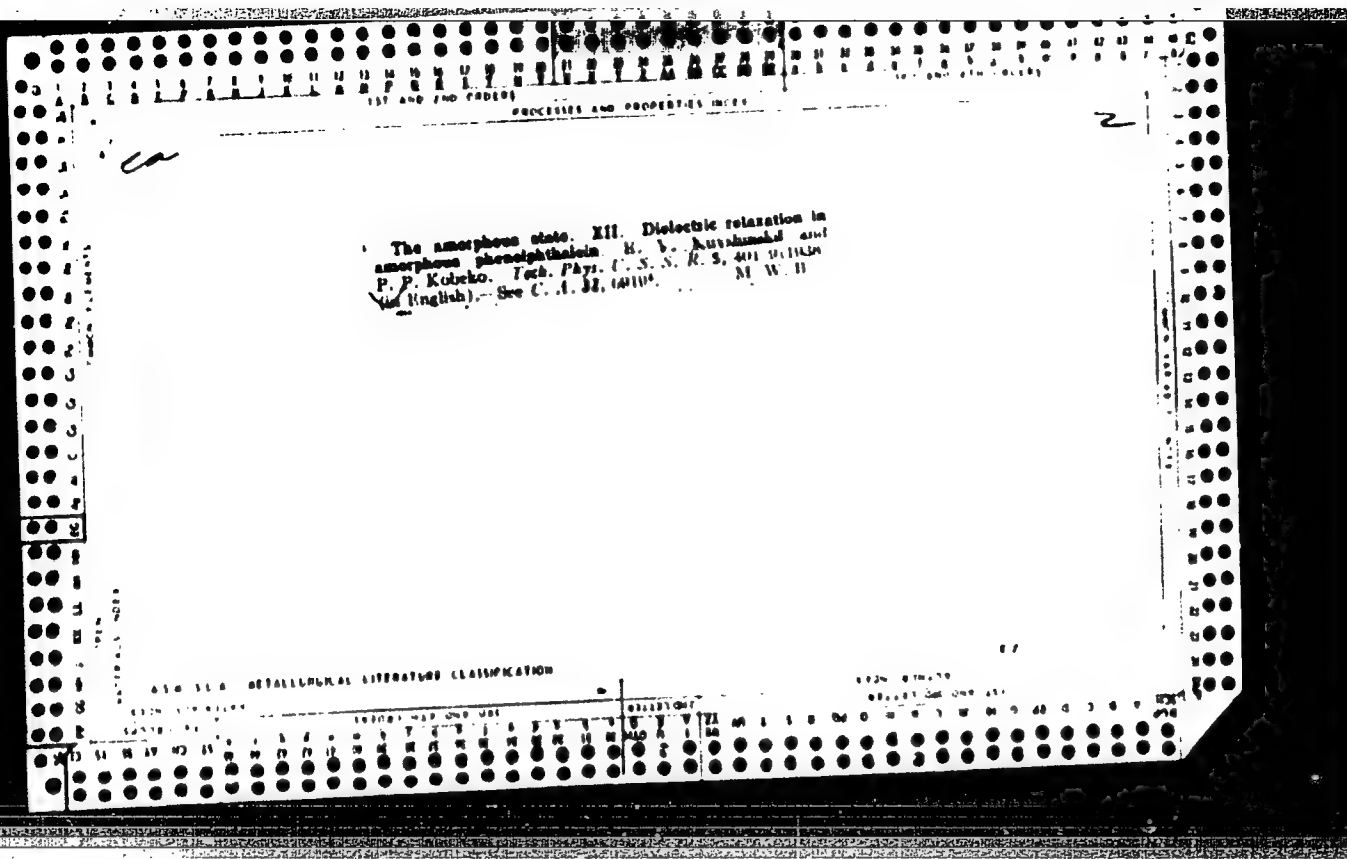
Amorphous state. IX. Electrical conductivity and viscosity of alcohols. P. P. KOBEKO, E. V. KUVSHINER, F. A. GOMOSHEVA, I. P. RACHMAN, and S. G. SMITHSON. X. Conductivity of strong electrolytes in the amorphous state. P. P. KOBEKO, E. V. KUVSHINER, and N. J. SOMMERMAN (Acta Physicochim. U.R.S.S., 1937, 6, 230-244, 255-263).—IX. For simple alcohols, glycerol, and solutions of HCl in  $C_2H_5OH$ ,  $\log \rho$  and  $\log \eta$  ( $\rho$  = sp. resistance,  $\eta$  = viscosity) are not linear functions of  $1/T$  over the amorphous and softening regions, but  $\log \rho$  is a linear function of  $\log \eta$  and Walden's law holds over wide temp. intervals. The variation of  $1/\rho$  with temp. is probably due to change of mobility and not to dissociation. Over the same temp. interval the dielectric const. ( $\epsilon$ ) rises slowly and then, beyond a certain temp., rapidly with rise of temp., finally falling with rise of temp. in the liquid state.

X.  $\rho$  and  $\epsilon$  have been determined for  $H_2SO_4$ ,  $H_2SO_4 \cdot 2H_2O$ ,  $H_2PO_4$ , and 25% aq. KOH, and  $\eta$  for  $H_2SO_4$  over the amorphous and softening regions.  $\log \rho$  is not a linear function of  $1/T$ , but is a linear function of  $\log \eta$ . Discontinuities occur in the  $\log \rho = f(1/T)$  curve, the portion below the discontinuity (i.e., for the amorphous state) being coincident with and an extension of the curve for the cryst. state. This can be explained on modern theory of the state of glasses (A., 1933, 12). J. W. S.

454.514 METALLURGICAL LITERATURE CLASSIFICATION

44. Elasticity of Amorphous Bodies. P. Kobeko, E. Kuvshinskiy and I. Gurevich. *Techn. Phys., U.S.S.R.* 4, 8, pp. 623-637, 1937. In English.—A notion is introduced of two components of reversible deformation: initial elastic or acoustic deformation and highly elastic deformation. Total mechanical deformation of amorphous bodies is composed of three independent components: the elastic initial deformation, resilient highly-elastic deformation and inelastic plastic deformation. The initial modulus of shearing stress in amorphous bodies is large. For phenol-phthalein, hard rubber and soft rubber it is equal to  $3 \times 10^4$  kg/cm<sup>2</sup>, and to 100 kg/cm<sup>2</sup> for rosin. The total modulus is many times less than the initial one. For soft rubber it is equal to 6 kg/cm<sup>2</sup>, for hard rubber—30 kg/cm<sup>2</sup>, for phenol-phthalein—3500 kg/cm<sup>2</sup>. The setting-in time of highly elastic deformation drops very sharply with increasing temperature. Soft rubber and hard rubber are highly elastic at high temperatures as well as at low temperatures. Cooling produces only a drop in the velocity of setting-in of the highly-elastic deformation, but the limiting magnitude of deformation does not change. The hardening of soft rubber and hard rubber takes place not by jumps, but gradually as the temperature goes down, and is similar to the process of turning into glass of monomeric bodies. The manifestation of highly elastic properties may take place at greatly differing viscosities. In polymers the viscosity in the softening interval is very large compared with that of monomeric materials. Autonom.

**A study of the amorphous state** IX Electric conductivity and viscosity of alcohols P. P. Kozlov, I. A. Kudymshin, and N. I. Shishkin. *J. Phys. Chem.*, U.S.S.R., 9, 136-9, (1947). (*J. C. A.*, 31, 496.) Data on the changes of viscosity, dielectric constants, and sp. resistances for Et., Pr., Bu., and i-Bu. and two-Am. alcs. and for glycer. are illustrated by graphs and tables. The Walden law holds for alcs. and their salts. With HCl over a wide range -80-120°K. where the first two are varied by a million times, the change of elec. cond. is due to changes in mobility only in either the pure state or in soln. The data show a lack of parallelism between the changes in the macroscopic viscosity and in the elec. cond. X Conductivity of strong electrolytes in the amorphous state P. P. Kozlov, I. A. Kudymshin, and N. I. Shishkin. *Izv. Vuzov*, 1947, 2, 101. The sp. resistances  $\rho$  and viscosities  $\eta$  of  $H_2SO_4$ ,  $HNO_3$ , and KOH and their solns were measured.  $\log \rho = a + b/\eta$  gives a curved line,  $\log \rho = c/\eta + d$  gives a straight line. Below its discontinuity, the curve  $\log \rho = a + b/\eta$  is the same for the amorphous as for the crystal state. The  $T_g$  temps. in degrees K. were  $H_2SO_4$ , 210;  $HNO_3$ , 140°; KOH, 270° in  $H_2O$ , 285°; also in *Acta Physicochim.* I. K. S. 6, 294-54, 1957. (1947).

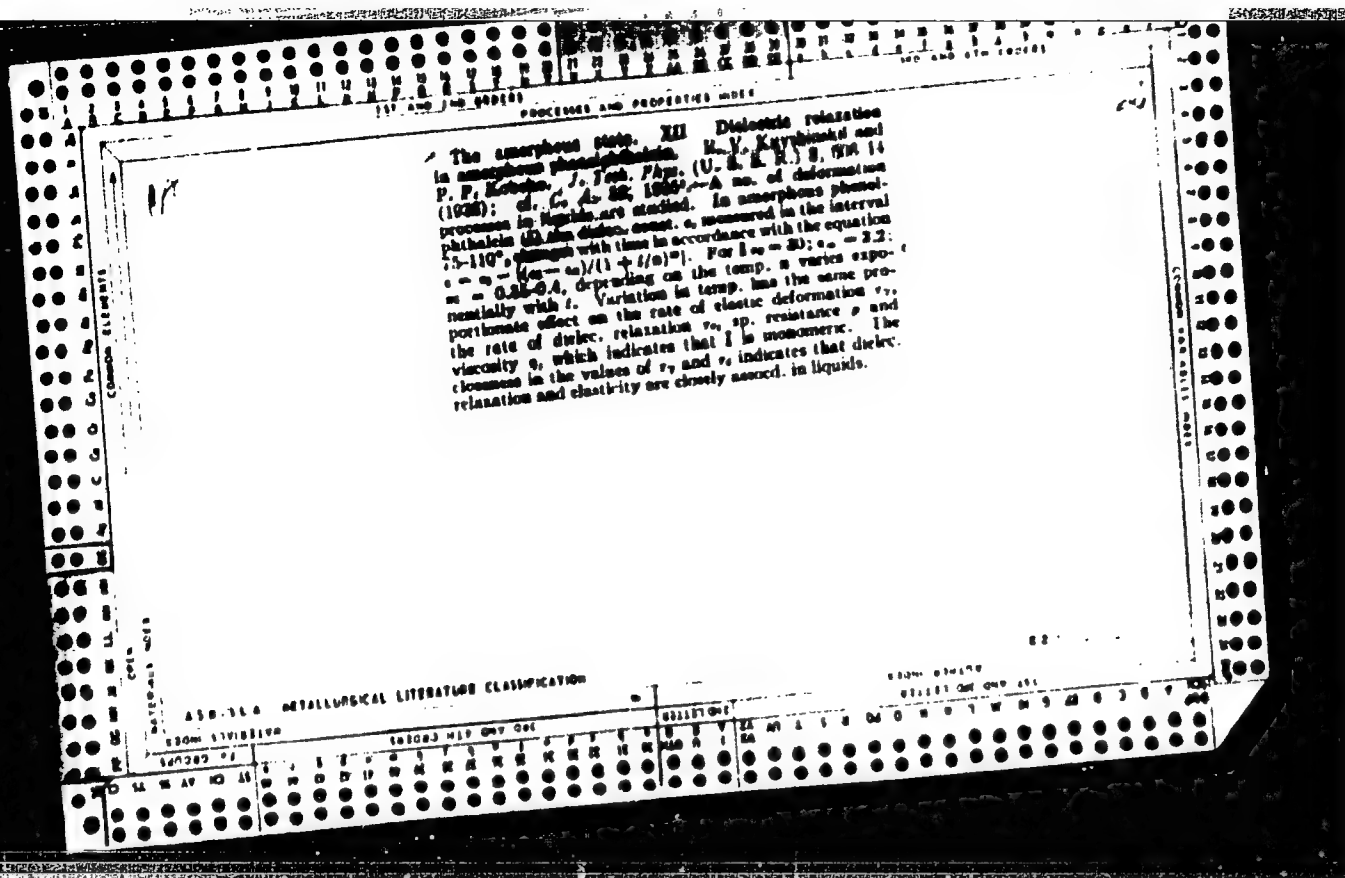


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Investigation of the amorphous state. XIII. Viscosity,  
electric conductivity and dielectric losses in alcohols and  
glycerol. P. F. Kobeko, N. V. Kuvshinov and N.  
Shakhin. *Tech. Phys.* U. S. S. R. 9, 413-24(1934) (in  
English).—See C. A. 32, 7704<sup>a</sup>. C I H ✓

ASH-SLA METALLURGICAL LITERATURE CLASSIFICATION



107 AND 108 (202) 100 AND 101 (202)

PROCESSING AND PROPERTIES INDEX

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The amorphous state. XIII. Viscosity, electric conductivity and dielectric losses in alcohols and glycerol. P. P. Kobeko, R. V. Kuvshinski and N. I. Mishkin. J. Tech. Phys. (U. S. S. R.) 8, 715-24(1938); cf. C. A. 31, 14889. -- Based on the proportional changes in viscosity, sp. resistance and time of dielec. relaxation with change in temp., valid over a wide temp. range, it is concluded that for monomeric liquids (alco., glycerol) the rates of both the reversible and irreversible processes of mod. viscous flow and of elec. cond. are regulated by the same phenomenon of dielec. polarization. John Livak

ASB. SLA METALLURGICAL LITERATURE CLASSIFICATION

107 AND 108 (202) 100 AND 101 (202)



The amorphous state. XIV. Thermal conductivity of amorphous substances within the range of softening. H. V. Kuvshinskii. *Tech. Phys.* (U. S. S. R. 3, 491 R. (in English); *J. Tech. Phys.* (U. S. S. R.) 6, 1114 R. (1934); *C. C. A.* 32, 7794). -The thermal cond.  $\lambda$ , detd. by the steady thermal flow method, of resins in the temp. range 30-90° is const. and equal to 0.0024 cal./degree cm. sec. For amorphous phenolphthalein in the range 35-115°  $\lambda$  is also const. and equal to 0.00255 cal./degree cm. sec. Conclusion: The retarded attainment of thermal equl., observed near  $T_g$  (glass temp.) in measuring specific heats and vols., is due to neither the decrease in  $\lambda$  nor to insufficiently rapid temp. equalization in the app., but is caused by relaxation processes (heat content and vol. relaxations) developing in the liquid itself. .. John Livak

John L. Smith

ASB-11A METALLURGICAL LITERATURE CLASSIFICATION

KUWACHINSKI, E. W.

AMORPHOUS STATE. XVIII. ELECTRICAL CONDUCTIVITY OF SUBSTANCES IN THE AMORPHOUS AND CRYSTALLINE STATES. P. P. Kobeko, E. W. Kuwachinski, and N. I. Schischkin (J. Physics U.S.S.R., 1940, 3, 287-296). -- The variation of sp. resistance ( $\rho$ ) with temp. (T) of borax, Rochelle salt, and LiOAc has been determined for the substances in the amorphous and cryst. states. For the melts of these substances the portion of the function  $\log \rho = f(1/T)$  is not linear. For substances in the vitreous state, i.e., considerably supercooled liquid, the relation is linear at low temp. The coeff. B in the expression  $\log \rho = A + B/T$  is almost the same for the above substances in the cryst. and vitreous states. The connexion between these results and X-ray structure is considered, and it is shown that Zachariasen's view (A., 1933, 12, 1107), that the arrangement of mols. in the lattices of silicate and borate glasses is the same as in the cryst. state, may be extended to all supercooled systems irrespective of their composition. Since B does not alter, any considerable change of the structure of a liquid with temp. is not possible.

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Peculiarities in the flow of solutions of high-molecular compounds. E. V. Kuvshinskii. *Trudy Konferentsii Vysshemolekulyarnykh Soedineniyev, Akad. Nauk S.S.S.R., Otdel. Khim. Nauk i Otdel. Fiz.-Mat. Nauk* 1, 11-12(1943) (Pub. 1948).--Dil. solns. of polymers with mol. wt. less than 60,000; and more concd. solns. of polymers with mol. wt. below 15,000 differ from normal solns. by showing abnormal viscosities and greater relaxation times. These factors cause a no. of anomalous effects in the form of gaseous or liquid droplets enclosed in the wine, and flowing with them, or when the solns. flow through narrow openings.

H. M. Leicester

ASD-SLA METALLURGICAL LITERATURE CLASSIFICATION

# Temperature dependence of the viscosity of liquids

P. P. Kozlov, E. V. Kuyshukov, and N. I. Shishkin (Leningrad Phys. Tech. Inst.; Akad. Nauk S.S.S.R. *Dokl. Akad. Nauk, Inst. Mekh. i Mashinostroyeniya, Seriya Khim. i Fiz. Zhidkosti i Koll. Rastvor. (Contrib. to the Physics of Liquids and Colloidal Solids)* 2, 71 (1964); cf. *C.A.B.*, 1969). —The currently admitted linear dependence of  $\log \eta$  (viscosity) on  $1/T$  (also temp.), of the form  $\log \eta = A + B/RT$ , requires that the quantities  $A$  and  $B$  be const. over the whole temp. interval. Admission of a thermal variability of  $B$  makes a comparison of the underlying theories with exptl. data impossible. Curves of  $\log \eta$  in terms of  $1/T$ , over as wide a temp. interval as is available, were constructed for a series of substances of widely different nature: diethyl ether, ethyl al., propyl al., isobutyl al., glycerol, rosin,  $\text{HCl}$ ,  $\text{H}_2\text{SO}_4$ ,  $\text{H}_3\text{PO}_4$ ,  $\text{H}_2\text{O}$ , silicate glass,  $\text{SiO}_2$ ,  $\text{BiCl}_3$ ,  $\text{LiNO}_3$ ,  $\text{NaCl}$ ,  $\text{Cd}$ ,  $\text{Sn}$ ,  $\text{Hg}$ , air. The graph shows a divergent fan of curves, are steeper the higher the softening point of the substance the temp. at which  $\eta$  becomes about  $10^{10}$  poises; thus, the steepest slope belongs to the curve of silicate glasses. For each individual curve, a relatively slight temp. dependence is found in regions of low  $\eta$ : as the liquid thickens, that is with increasing  $\eta$  (decreasing temp.), the slope becomes ever steeper. In the steeper portions of the curves, the curvature is pronounced over temp. intervals other than very narrow ones. There are no discontinuities, and

consequently there is no justification for representing the curves as composed of two intersecting linear portions. Although for certain substances such as metals and fused inorg. salts, data are available only over a relatively short temp. interval, their fragmentary curves do fit into the general picture and appear to prolong those of the other substances. All curves fan out toward higher viscosities and lower temps. Certain substances, such as glucose, silicate glasses, show in the low-temp. region of  $\eta$  less than  $10^{10}$  poises, a change of curvature, becoming convex on the side farthest from the  $1/T$  axis. On the other hand, viscosity data are available for a series of liquid substances over a temp. interval extending as far as the crit. temp., and also in the gaseous state (e.g.,  $\text{CH}_4$ ,  $\text{C}_2\text{H}_6$ ,  $\text{C}_3\text{H}_8$ ,  $\text{C}_4\text{H}_{10}$ ,  $\text{C}_5\text{H}_{12}$ ,  $\text{C}_6\text{H}_{14}$ ,  $\text{C}_7\text{H}_{16}$ ,  $\text{C}_8\text{H}_{18}$ ,  $\text{C}_9\text{H}_{20}$ ,  $\text{C}_{10}\text{H}_{22}$ ,  $\text{C}_{12}\text{H}_{26}$ ,  $\text{C}_{14}\text{H}_{30}$ ,  $\text{C}_{16}\text{H}_{34}$ ,  $\text{C}_{18}\text{H}_{38}$ ,  $\text{C}_{20}\text{H}_{42}$ ,  $\text{C}_{22}\text{H}_{46}$ ,  $\text{C}_{24}\text{H}_{50}$ ,  $\text{C}_{26}\text{H}_{54}$ ,  $\text{C}_{28}\text{H}_{58}$ ,  $\text{C}_{30}\text{H}_{62}$ ,  $\text{C}_{32}\text{H}_{66}$ ,  $\text{C}_{34}\text{H}_{70}$ ,  $\text{C}_{36}\text{H}_{74}$ ,  $\text{C}_{38}\text{H}_{78}$ ,  $\text{C}_{40}\text{H}_{82}$ ,  $\text{C}_{42}\text{H}_{86}$ ,  $\text{C}_{44}\text{H}_{90}$ ,  $\text{C}_{46}\text{H}_{94}$ ,  $\text{C}_{48}\text{H}_{98}$ ,  $\text{C}_{50}\text{H}_{102}$ ,  $\text{C}_{52}\text{H}_{106}$ ,  $\text{C}_{54}\text{H}_{110}$ ,  $\text{C}_{56}\text{H}_{114}$ ,  $\text{C}_{58}\text{H}_{118}$ ,  $\text{C}_{60}\text{H}_{122}$ ,  $\text{C}_{62}\text{H}_{126}$ ,  $\text{C}_{64}\text{H}_{130}$ ,  $\text{C}_{66}\text{H}_{134}$ ,  $\text{C}_{68}\text{H}_{138}$ ,  $\text{C}_{70}\text{H}_{142}$ ,  $\text{C}_{72}\text{H}_{146}$ ,  $\text{C}_{74}\text{H}_{150}$ ,  $\text{C}_{76}\text{H}_{154}$ ,  $\text{C}_{78}\text{H}_{158}$ ,  $\text{C}_{80}\text{H}_{162}$ ,  $\text{C}_{82}\text{H}_{166}$ ,  $\text{C}_{84}\text{H}_{170}$ ,  $\text{C}_{86}\text{H}_{174}$ ,  $\text{C}_{88}\text{H}_{178}$ ,  $\text{C}_{90}\text{H}_{182}$ ,  $\text{C}_{92}\text{H}_{186}$ ,  $\text{C}_{94}\text{H}_{190}$ ,  $\text{C}_{96}\text{H}_{194}$ ,  $\text{C}_{98}\text{H}_{198}$ ,  $\text{C}_{100}\text{H}_{202}$ ,  $\text{C}_{102}\text{H}_{206}$ ,  $\text{C}_{104}\text{H}_{210}$ ,  $\text{C}_{106}\text{H}_{214}$ ,  $\text{C}_{108}\text{H}_{218}$ ,  $\text{C}_{110}\text{H}_{222}$ ,  $\text{C}_{112}\text{H}_{226}$ ,  $\text{C}_{114}\text{H}_{230}$ ,  $\text{C}_{116}\text{H}_{234}$ ,  $\text{C}_{118}\text{H}_{238}$ ,  $\text{C}_{120}\text{H}_{242}$ ,  $\text{C}_{122}\text{H}_{246}$ ,  $\text{C}_{124}\text{H}_{250}$ ,  $\text{C}_{126}\text{H}_{254}$ ,  $\text{C}_{128}\text{H}_{258}$ ,  $\text{C}_{130}\text{H}_{262}$ ,  $\text{C}_{132}\text{H}_{266}$ ,  $\text{C}_{134}\text{H}_{270}$ ,  $\text{C}_{136}\text{H}_{274}$ ,  $\text{C}_{138}\text{H}_{278}$ ,  $\text{C}_{140}\text{H}_{282}$ ,  $\text{C}_{142}\text{H}_{286}$ ,  $\text{C}_{144}\text{H}_{290}$ ,  $\text{C}_{146}\text{H}_{294}$ ,  $\text{C}_{148}\text{H}_{298}$ ,  $\text{C}_{150}\text{H}_{302}$ ,  $\text{C}_{152}\text{H}_{306}$ ,  $\text{C}_{154}\text{H}_{310}$ ,  $\text{C}_{156}\text{H}_{314}$ ,  $\text{C}_{158}\text{H}_{318}$ ,  $\text{C}_{160}\text{H}_{322}$ ,  $\text{C}_{162}\text{H}_{326}$ ,  $\text{C}_{164}\text{H}_{330}$ ,  $\text{C}_{166}\text{H}_{334}$ ,  $\text{C}_{168}\text{H}_{338}$ ,  $\text{C}_{170}\text{H}_{342}$ ,  $\text{C}_{172}\text{H}_{346}$ ,  $\text{C}_{174}\text{H}_{350}$ ,  $\text{C}_{176}\text{H}_{354}$ ,  $\text{C}_{178}\text{H}_{358}$ ,  $\text{C}_{180}\text{H}_{362}$ ,  $\text{C}_{182}\text{H}_{366}$ ,  $\text{C}_{184}\text{H}_{370}$ ,  $\text{C}_{186}\text{H}_{374}$ ,  $\text{C}_{188}\text{H}_{378}$ ,  $\text{C}_{190}\text{H}_{382}$ ,  $\text{C}_{192}\text{H}_{386}$ ,  $\text{C}_{194}\text{H}_{390}$ ,  $\text{C}_{196}\text{H}_{394}$ ,  $\text{C}_{198}\text{H}_{398}$ ,  $\text{C}_{200}\text{H}_{402}$ ,  $\text{C}_{202}\text{H}_{406}$ ,  $\text{C}_{204}\text{H}_{410}$ ,  $\text{C}_{206}\text{H}_{414}$ ,  $\text{C}_{208}\text{H}_{418}$ ,  $\text{C}_{210}\text{H}_{422}$ ,  $\text{C}_{212}\text{H}_{426}$ ,  $\text{C}_{214}\text{H}_{430}$ ,  $\text{C}_{216}\text{H}_{434}$ ,  $\text{C}_{218}\text{H}_{438}$ ,  $\text{C}_{220}\text{H}_{442}$ ,  $\text{C}_{222}\text{H}_{446}$ ,  $\text{C}_{224}\text{H}_{450}$ ,  $\text{C}_{226}\text{H}_{454}$ ,  $\text{C}_{228}\text{H}_{458}$ ,  $\text{C}_{230}\text{H}_{462}$ ,  $\text{C}_{232}\text{H}_{466}$ ,  $\text{C}_{234}\text{H}_{470}$ ,  $\text{C}_{236}\text{H}_{474}$ ,  $\text{C}_{238}\text{H}_{478}$ ,  $\text{C}_{240}\text{H}_{482}$ ,  $\text{C}_{242}\text{H}_{486}$ ,  $\text{C}_{244}\text{H}_{490}$ ,  $\text{C}_{246}\text{H}_{494}$ ,  $\text{C}_{248}\text{H}_{498}$ ,  $\text{C}_{250}\text{H}_{502}$ ,  $\text{C}_{252}\text{H}_{506}$ ,  $\text{C}_{254}\text{H}_{510}$ ,  $\text{C}_{256}\text{H}_{514}$ ,  $\text{C}_{258}\text{H}_{518}$ ,  $\text{C}_{260}\text{H}_{522}$ ,  $\text{C}_{262}\text{H}_{526}$ ,  $\text{C}_{264}\text{H}_{530}$ ,  $\text{C}_{266}\text{H}_{534}$ ,  $\text{C}_{268}\text{H}_{538}$ ,  $\text{C}_{270}\text{H}_{542}$ ,  $\text{C}_{272}\text{H}_{546}$ ,  $\text{C}_{274}\text{H}_{550}$ ,  $\text{C}_{276}\text{H}_{554}$ ,  $\text{C}_{278}\text{H}_{558}$ ,  $\text{C}_{280}\text{H}_{562}$ ,  $\text{C}_{282}\text{H}_{566}$ ,  $\text{C}_{284}\text{H}_{570}$ ,  $\text{C}_{286}\text{H}_{574}$ ,  $\text{C}_{288}\text{H}_{578}$ ,  $\text{C}_{290}\text{H}_{582}$ ,  $\text{C}_{292}\text{H}_{586}$ ,  $\text{C}_{294}\text{H}_{590}$ ,  $\text{C}_{296}\text{H}_{594}$ ,  $\text{C}_{298}\text{H}_{598}$ ,  $\text{C}_{300}\text{H}_{602}$ ,  $\text{C}_{302}\text{H}_{606}$ ,  $\text{C}_{304}\text{H}_{610}$ ,  $\text{C}_{306}\text{H}_{614}$ ,  $\text{C}_{308}\text{H}_{618}$ ,  $\text{C}_{310}\text{H}_{622}$ ,  $\text{C}_{312}\text{H}_{626}$ ,  $\text{C}_{314}\text{H}_{630}$ ,  $\text{C}_{316}\text{H}_{634}$ ,  $\text{C}_{318}\text{H}_{638}$ ,  $\text{C}_{320}\text{H}_{642}$ ,  $\text{C}_{322}\text{H}_{646}$ ,  $\text{C}_{324}\text{H}_{650}$ ,  $\text{C}_{326}\text{H}_{654}$ ,  $\text{C}_{328}\text{H}_{658}$ ,  $\text{C}_{330}\text{H}_{662}$ ,  $\text{C}_{332}\text{H}_{666}$ ,  $\text{C}_{334}\text{H}_{670}$ ,  $\text{C}_{336}\text{H}_{674}$ ,  $\text{C}_{338}\text{H}_{678}$ ,  $\text{C}_{340}\text{H}_{682}$ ,  $\text{C}_{342}\text{H}_{686}$ ,  $\text{C}_{344}\text{H}_{690}$ ,  $\text{C}_{346}\text{H}_{694}$ ,  $\text{C}_{348}\text{H}_{698}$ ,  $\text{C}_{350}\text{H}_{702}$ ,  $\text{C}_{352}\text{H}_{706}$ ,  $\text{C}_{354}\text{H}_{710}$ ,  $\text{C}_{356}\text{H}_{714}$ ,  $\text{C}_{358}\text{H}_{718}$ ,  $\text{C}_{360}\text{H}_{722}$ ,  $\text{C}_{362}\text{H}_{726}$ ,  $\text{C}_{364}\text{H}_{730}$ ,  $\text{C}_{366}\text{H}_{734}$ ,  $\text{C}_{368}\text{H}_{738}$ ,  $\text{C}_{370}\text{H}_{742}$ ,  $\text{C}_{372}\text{H}_{746}$ ,  $\text{C}_{374}\text{H}_{750}$ ,  $\text{C}_{376}\text{H}_{754}$ ,  $\text{C}_{378}\text{H}_{758}$ ,  $\text{C}_{380}\text{H}_{762}$ ,  $\text{C}_{382}\text{H}_{766}$ ,  $\text{C}_{384}\text{H}_{770}$ ,  $\text{C}_{386}\text{H}_{774}$ ,  $\text{C}_{388}\text{H}_{778}$ ,  $\text{C}_{390}\text{H}_{782}$ ,  $\text{C}_{392}\text{H}_{786}$ ,  $\text{C}_{394}\text{H}_{790}$ ,  $\text{C}_{396}\text{H}_{794}$ ,  $\text{C}_{398}\text{H}_{798}$ ,  $\text{C}_{400}\text{H}_{802}$ ,  $\text{C}_{402}\text{H}_{806}$ ,  $\text{C}_{404}\text{H}_{810}$ ,  $\text{C}_{406}\text{H}_{814}$ ,  $\text{C}_{408}\text{H}_{818}$ ,  $\text{C}_{410}\text{H}_{822}$ ,  $\text{C}_{412}\text{H}_{826}$ ,  $\text{C}_{414}\text{H}_{830}$ ,  $\text{C}_{416}\text{H}_{834}$ ,  $\text{C}_{418}\text{H}_{838}$ ,  $\text{C}_{420}\text{H}_{842}$ ,  $\text{C}_{422}\text{H}_{846}$ ,  $\text{C}_{424}\text{H}_{850}$ ,  $\text{C}_{426}\text{H}_{854}$ ,  $\text{C}_{428}\text{H}_{858}$ ,  $\text{C}_{430}\text{H}_{862}$ ,  $\text{C}_{432}\text{H}_{866}$ ,  $\text{C}_{434}\text{H}_{870}$ ,  $\text{C}_{436}\text{H}_{874}$ ,  $\text{C}_{438}\text{H}_{878}$ ,  $\text{C}_{440}\text{H}_{882}$ ,  $\text{C}_{442}\text{H}_{886}$ ,  $\text{C}_{444}\text{H}_{890}$ ,  $\text{C}_{446}\text{H}_{894}$ ,  $\text{C}_{448}\text{H}_{898}$ ,  $\text{C}_{450}\text{H}_{902}$ ,  $\text{C}_{452}\text{H}_{906}$ ,  $\text{C}_{454}\text{H}_{910}$ ,  $\text{C}_{456}\text{H}_{914}$ ,  $\text{C}_{458}\text{H}_{918}$ ,  $\text{C}_{460}\text{H}_{922}$ ,  $\text{C}_{462}\text{H}_{926}$ ,  $\text{C}_{464}\text{H}_{930}$ ,  $\text{C}_{466}\text{H}_{934}$ ,  $\text{C}_{468}\text{H}_{938}$ ,  $\text{C}_{470}\text{H}_{942}$ ,  $\text{C}_{472}\text{H}_{946}$ ,  $\text{C}_{474}\text{H}_{950}$ ,  $\text{C}_{476}\text{H}_{954}$ ,  $\text{C}_{478}\text{H}_{958}$ ,  $\text{C}_{480}\text{H}_{962}$ ,  $\text{C}_{482}\text{H}_{966}$ ,  $\text{C}_{484}\text{H}_{970}$ ,  $\text{C}_{486}\text{H}_{974}$ ,  $\text{C}_{488}\text{H}_{978}$ ,  $\text{C}_{490}\text{H}_{982}$ ,  $\text{C}_{492}\text{H}_{986}$ ,  $\text{C}_{494}\text{H}_{990}$ ,  $\text{C}_{496}\text{H}_{994}$ ,  $\text{C}_{498}\text{H}_{998}$ ,  $\text{C}_{500}\text{H}_{1002}$ ,  $\text{C}_{502}\text{H}_{1006}$ ,  $\text{C}_{504}\text{H}_{1010}$ ,  $\text{C}_{506}\text{H}_{1014}$ ,  $\text{C}_{508}\text{H}_{1018}$ ,  $\text{C}_{510}\text{H}_{1022}$ ,  $\text{C}_{512}\text{H}_{1026}$ ,  $\text{C}_{514}\text{H}_{1030}$ ,  $\text{C}_{516}\text{H}_{1034}$ ,  $\text{C}_{518}\text{H}_{1038}$ ,  $\text{C}_{520}\text{H}_{1042}$ ,  $\text{C}_{522}\text{H}_{1046}$ ,  $\text{C}_{524}\text{H}_{1050}$ ,  $\text{C}_{526}\text{H}_{1054}$ ,  $\text{C}_{528}\text{H}_{1058}$ ,  $\text{C}_{530}\text{H}_{1062}$ ,  $\text{C}_{532}\text{H}_{1066}$ ,  $\text{C}_{534}\text{H}_{1070}$ ,  $\text{C}_{536}\text{H}_{1074}$ ,  $\text{C}_{538}\text{H}_{1078}$ ,  $\text{C}_{540}\text{H}_{1082}$ ,  $\text{C}_{542}\text{H}_{1086}$ ,  $\text{C}_{544}\text{H}_{1090}$ ,  $\text{C}_{546}\text{H}_{1094}$ ,  $\text{C}_{548}\text{H}_{1098}$ ,  $\text{C}_{550}\text{H}_{1102}$ ,  $\text{C}_{552}\text{H}_{1106}$ ,  $\text{C}_{554}\text{H}_{1110}$ ,  $\text{C}_{556}\text{H}_{1114}$ ,  $\text{C}_{558}\text{H}_{1118}$ ,  $\text{C}_{560}\text{H}_{1122}$ ,  $\text{C}_{562}\text{H}_{1126}$ ,  $\text{C}_{564}\text{H}_{1130}$ ,  $\text{C}_{566}\text{H}_{1134}$ ,  $\text{C}_{568}\text{H}_{1138}$ ,  $\text{C}_{570}\text{H}_{1142}$ ,  $\text{C}_{572}\text{H}_{1146}$ ,  $\text{C}_{574}\text{H}_{1150}$ ,  $\text{C}_{576}\text{H}_{1154}$ ,  $\text{C}_{578}\text{H}_{1158}$ ,  $\text{C}_{580}\text{H}_{1162}$ ,  $\text{C}_{582}\text{H}_{1166}$ ,  $\text{C}_{584}\text{H}_{1170}$ ,  $\text{C}_{586}\text{H}_{1174}$ ,  $\text{C}_{588}\text{H}_{1178}$ ,  $\text{C}_{590}\text{H}_{1182}$ ,  $\text{C}_{592}\text{H}_{1186}$ ,  $\text{C}_{594}\text{H}_{1190}$ ,  $\text{C}_{596}\text{H}_{1194}$ ,  $\text{C}_{598}\text{H}_{1198}$ ,  $\text{C}_{600}\text{H}_{1202}$ ,  $\text{C}_{602}\text{H}_{1206}$ ,  $\text{C}_{604}\text{H}_{1210}$ ,  $\text{C}_{606}\text{H}_{1214}$ ,  $\text{C}_{608}\text{H}_{1218}$ ,  $\text{C}_{610}\text{H}_{1222}$ ,  $\text{C}_{612}\text{H}_{1226}$ ,  $\text{C}_{614}\text{H}_{1230}$ ,  $\text{C}_{616}\text{H}_{1234}$ ,  $\text{C}_{618}\text{H}_{1238}$ ,  $\text{C}_{620}\text{H}_{1242}$ ,  $\text{C}_{622}\text{H}_{1246}$ ,  $\text{C}_{624}\text{H}_{1250}$ ,  $\text{C}_{626}\text{H}_{1254}$ ,  $\text{C}_{628}\text{H}_{1258}$ ,  $\text{C}_{630}\text{H}_{1262}$ ,  $\text{C}_{632}\text{H}_{1266}$ ,  $\text{C}_{634}\text{H}_{1270}$ ,  $\text{C}_{636}\text{H}_{1274}$ ,  $\text{C}_{638}\text{H}_{1278}$ ,  $\text{C}_{640}\text{H}_{1282}$ ,  $\text{C}_{642}\text{H}_{1286}$ ,  $\text{C}_{644}\text{H}_{1290}$ ,  $\text{C}_{646}\text{H}_{1294}$ ,  $\text{C}_{648}\text{H}_{1298}$ ,  $\text{C}_{650}\text{H}_{1302}$ ,  $\text{C}_{652}\text{H}_{1306}$ ,  $\text{C}_{654}\text{H}_{1310}$ ,  $\text{C}_{656}\text{H}_{1314}$ ,  $\text{C}_{658}\text{H}_{1318}$ ,  $\text{C}_{660}\text{H}_{1322}$ ,  $\text{C}_{662}\text{H}_{1326}$ ,  $\text{C}_{664}\text{H}_{1330}$ ,  $\text{C}_{666}\text{H}_{1334}$ ,  $\text{C}_{668}\text{H}_{1338}$ ,  $\text{C}_{670}\text{H}_{1342}$ ,  $\text{C}_{672}\text{H}_{1346}$ ,  $\text{C}_{674}\text{H}_{1350}$ ,  $\text{C}_{676}\text{H}_{1354}$ ,  $\text{C}_{678}\text{H}_{1358}$ ,  $\text{C}_{680}\text{H}_{1362}$ ,  $\text{C}_{682}\text{H}_{1366}$ ,  $\text{C}_{684}\text{H}_{1370}$ ,  $\text{C}_{686}\text{H}_{1374}$ ,  $\text{C}_{688}\text{H}_{1378}$ ,  $\text{C}_{690}\text{H}_{1382}$ ,  $\text{C}_{692}\text{H}_{1386}$ ,  $\text{C}_{694}\text{H}_{1390}$ ,  $\text{C}_{696}\text{H}_{1394}$ ,  $\text{C}_{698}\text{H}_{1398}$ ,  $\text{C}_{700}\text{H}_{1402}$ ,  $\text{C}_{702}\text{H}_{1406}$ ,  $\text{C}_{704}\text{H}_{1410}$ ,  $\text{C}_{706}\text{H}_{1414}$ ,  $\text{C}_{708}\text{H}_{1418}$ ,  $\text{C}_{710}\text{H}_{1422}$ ,  $\text{C}_{712}\text{H}_{1426}$ ,  $\text{C}_{714}\text{H}_{1430}$ ,  $\text{C}_{716}\text{H}_{1434}$ ,  $\text{C}_{718}\text{H}_{1438}$ ,  $\text{C}_{720}\text{H}_{1442}$ ,  $\text{C}_{722}\text{H}_{1446}$ ,  $\text{C}_{724}\text{H}_{1450}$ ,  $\text{C}_{726}\text{H}_{1454}$ ,  $\text{C}_{728}\text{H}_{1458}$ ,  $\text{C}_{730}\text{H}_{1462}$ ,  $\text{C}_{732}\text{H}_{1466}$ ,  $\text{C}_{734}\text{H}_{1470}$ ,  $\text{C}_{736}\text{H}_{1474}$ ,  $\text{C}_{738}\text{H}_{1478}$ ,  $\text{C}_{740}\text{H}_{1482}$ ,  $\text{C}_{742}\text{H}_{1486}$ ,  $\text{C}_{744}\text{H}_{1490}$ ,  $\text{C}_{746}\text{H}_{1494}$ ,  $\text{C}_{748}\text{H}_{1498}$ ,  $\text{C}_{750}\text{H}_{1502}$ ,  $\text{C}_{752}\text{H}_{1506}$ ,  $\text{C}_{754}\text{H}_{1510}$ ,  $\text{C}_{756}\text{H}_{1514}$ ,  $\text{C}_{758}\text{H}_{1518}$ ,  $\text{C}_{760}\text{H}_{1522}$ ,  $\text{C}_{762}\text{H}_{1526}$ ,  $\text{C}_{764}\text{H}_{1530}$ ,  $\text{C}_{766}\text{H}_{1534}$ ,  $\text{C}_{768}\text{H}_{1538}$ ,  $\text{C}_{770}\text{H}_{1542}$ ,  $\text{C}_{772}\text{H}_{1546}$ ,  $\text{C}_{774}\text{H}_{1550}$ ,  $\text{C}_{776}\text{H}_{1554}$ ,  $\text{C}_{778}\text{H}_{1558}$ ,  $\text{C}_{780}\text{H}_{1562}$ ,  $\text{C}_{782}\text{H}_{1566}$ ,  $\text{C}_{784}\text{H}_{1570}$ ,  $\text{C}_{786}\text{H}_{1574}$ ,  $\text{C}_{788}\text{H}_{1578}$ ,  $\text{C}_{790}\text{H}_{1582}$ ,  $\text{C}_{792}\text{H}_{1586}$ ,  $\text{C}_{794}\text{H}_{1590}$ ,  $\text{C}_{796}\text{H}_{1594}$ ,  $\text{C}_{798}\text{H}_{1598}$ ,  $\text{C}_{800}\text{H}_{1602}$ ,  $\text{C}_{802}\text{H}_{1606}$ ,  $\text{C}_{804}\text{H}_{1610}$ ,  $\text{C}_{806}\text{H}_{1614}$ ,  $\text{C}_{808}\text{H}_{1618}$ ,  $\text{C}_{810}\text{H}_{1622}$ ,  $\text{C}_{812}\text{H}_{1626}$ ,  $\text{C}_{814}\text{H}_{1630}$ ,  $\text{C}_{816}\text{H}_{1634}$ ,  $\text{C}_{818}\text{H}_{1638}$ ,  $\text{C}_{820}\text{H}_{1642}$ ,  $\text{C}_{822}\text{H}_{1646}$ ,  $\text{C}_{824}\text{H}_{1650}$ ,  $\text{C}_{826}\text{H}_{1654}$ ,  $\text{C}_{828}\text{H}_{1658}$ ,  $\text{C}_{830}\text{H}_{1662}$ ,  $\text{C}_{832}\text{H}_{1666}$ ,  $\text{C}_{834}\text{H}_{1670}$ ,  $\text{C}_{836}\text{H}_{1674}$ ,  $\text{C}_{838}\text{H}_{1678}$ ,  $\text{C}_{840}\text{H}_{1682}$ ,  $\text{C}_{842}\text{H}_{1686}$ ,  $\text{C}_{844}\text{H}_{1690}$ ,  $\text{C}_{846}\text{H}_{1694}$ ,  $\text{C}_{848}\text{H}_{1698}$ ,  $\text{C}_{850}\text{H}_{1702}$ ,  $\text{C}_{852}\text{H}_{1706}$ ,  $\text{C}_{854}\text{H}_{1710}$ ,  $\text{C}_{856}\text{H}_{1714}$ ,  $\text{C}_{858}\text{H}_{1718}$ ,  $\text{C}_{860}\text{H}_{1722}$ ,  $\text{C}_{862}\text{H}_{1726}$ ,  $\text{C}_{864}\text{H}_{1730}$ ,  $\text{C}_{866}\text{H}_{1734}$ ,  $\text{C}_{868}\text{H}_{1738}$ ,  $\text{C}_{870}\text{H}_{1742}$ ,  $\text{C}_{872}\text{H}_{1746}$ ,  $\text{C}_{874}\text{H}_{1750}$ ,  $\text{C}_{876}\text{H}_{1754}$ ,  $\text{C}_{878}\text{H}_{1758}$ ,  $\text{C}_{880}\text{H}_{1762}$ ,  $\text{C}_{882}\text{H}_{1766}$ ,  $\text{C}_{884}\text{H}_{1770}$ ,  $\text{C}_{886}\text{H}_{1774}$ ,  $\text{C}_{888}\text{H}_{1778}$ ,  $\text{C}_{890}\text{H}_{1782}$ ,  $\text{C}_{892}\text{H}_{1786}$ ,  $\text{C}_{894}\text{H}_{1790}$ ,  $\text{C}_{896}\text{H}_{1794}$ ,  $\text{C}_{898}\text{H}_{1798}$ ,  $\text{C}_{900}\text{H}_{1802}$ ,  $\text{C}_{902}\text{H}_{1806}$ ,  $\text{C}_{904}\text{H}_{1810}$ ,  $\text{C}_{906}\text{H}_{1814}$ ,  $\text{C}_{908}\text{H}_{1818}$ ,  $\text{C}_{910}\text{H}_{1822}$ ,  $\text{C}_{912}\text{H}_{1826}$ ,  $\text{C}_{914}\text{H}_{1830}$ ,  $\text{C}_{916}\text{H}_{1834}$ ,  $\text{C}_{918}\text{H}_{1838}$ ,  $\text{C}_{920}\text{H}_{1842}$ ,  $\text{C}_{922}\text{H}_{1846}$ ,  $\text{C}_{924}\text{H}_{1850}$ ,  $\text{C}_{926}\text{H}_{1854}$ ,  $\text{C}_{928}\text{H}_{1858}$ ,  $\text{C}_{930}\text{H}_{1862}$ ,  $\text{C}_{932}\text{H}_{1866}$ ,  $\text{C}_{934}\text{H}_{1870}$ ,  $\text{C}_{936}\text{H}_{1874}$ ,  $\text{C}_{938}\text{H}_{1878}$ ,  $\text{C}_{940}\text{H}_{1882}$ ,  $\text{C}_{942}\text{H}_{1886}$ ,  $\text{C}_{944}\text{H}_{1890}$ ,  $\text{C}_{946}\text{H}_{1894}$ ,  $\text{C}_{948}\text{H}_{1898}$ ,  $\text{C}_{950}\text{H}_{1902}$ ,  $\text{C}_{952}\text{H}_{1906}$ ,  $\text{C}_{954}\text{H}_{1910}$ ,  $\text{C}_{956}\text{H}_{1914}$ ,  $\text{C}_{958}\text{H}_{1918}$ ,  $\text{C}_{960}\text{H}_{1922}$ ,  $\text{C}_{962}\text{H}_{1926}$ ,  $\text{C}_{964}\text{H}_{1930}$ ,  $\text{C}_{966}\text{H}_{1934}$ ,  $\text{C}_{968}\text{H}_{1938}$ ,  $\text{C}_{970}\text{H}_{1942}$ ,  $\text{C}_{972}\text{H}_{1946}$ ,  $\text{C}_{974}\text{H}_{1950}$ ,  $\text{C}_{976}\text{H}_{1954}$ ,  $\text{C}_{978}\text{H}_{1958}$ ,  $\text{C}_{980}\text{H}_{1962}$ ,  $\text{C}_{982}\text{H}_{1966}$ ,  $\text{C}_{984}\text{H}_{1970}$ ,  $\text{C}_{986}\text{H}_{1974}$ ,  $\text{C}_{988}\text{H}_{1978}$ ,  $\text{C}_{990}\text{H}_{1982}$ ,  $\text{C}_{992}\text{H}_{1986}$ ,  $\text{C}_{994}\text{H}_{1990}$ ,  $\text{C}_{996}\text{H}_{1994}$ ,  $\text{C}_{998}\text{H}_{1998}$ ,  $\text{C}_{1000}\text{H}_{2002}$ ,  $\text{C}_{1002}\text{H}_{2006}$ ,  $\text{C}_{1004}\text{H}_{2010}$ ,  $\text{C}_{1006}\text{H}_{2014}$ ,  $\text{C}_{1008}\text{H}_{2018}$ ,  $\text{C}_{1010}\text{H}_{2022}$ ,  $\text{C}_{1012}\text{H}_{2026}$ ,  $\text{C}_{1014}\text{H}_{2030}$ ,  $\text{C}_{1016}\text{H}_{2034}$ ,  $\text{C}_{1018}\text{H}_{2038}$ ,  $\text{C}_{1020}\text{H}_{2042}$ ,  $\text{C}_{1022}\text{H}_{2046}$ ,  $\text{C}_{1024}\text{H}_{2050}$ ,  $\text{C}_{1026}\text{H}_{2054}$ ,  $\text{C}_{1028}\text{H}_{2058}$ ,  $\text{C}_{1030}\text{H}_{2062}$ ,  $\text{C}_{1032}\text{H}_{2066}$ ,  $\text{C}_{1034}\text{H}_{2070}$ ,  $\text{C}_{1036}\text{H}_{2074}$ ,  $\text{C}_{1038}\text{H}_{2078}$ ,  $\text{C}_{1040}\text{H}_{2082}$ ,  $\text{C}_{1042}\text{H}_{2086}$ ,  $\text{C}_{1044}\text{H}_{2090}$ ,  $\text{C}_{1046}\text{H}_{2094}$ ,  $\text{C}_{1048}\text{H}_{2098}$ ,  $\text{C}_{1050}\text{H}_{2102}$ ,  $\text{C}_{1052}\text{H}_{2106}$ ,  $\text{C}_{1054}\text{H}_{2110}$ ,  $\text{$

C/1

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The amorphous state. XIX. Temperature dependence of the viscosity of liquids. P. P. Kobeko, S. V. Kuvshinskii and N. I. Shishkin. *J. Tech. Phys.* (U.S.S.R.) 14, 8-9 (1944). - The log of viscosity is plotted as a function of temp. for very different substances: ethers, alks., glycerol, org. glasses,  $H_2O$ , glass,  $SiO_2$ , molten salts, molten metals, air. All curves have a similar trend; they are flat for low-melting, steep for high-melting products. In a complete system the viscosity curve of the liquid drops (neg. temp. coeff.) to a viscosity of  $10^{-1}$  to  $4 \times 10^{-6}$  poises and, at the crit. temp., reverses to the opposite direction (pos. temp. coeff. of viscosity in a gas). It is believed possible to develop a general theory for all liquids. S. Pakser

ASB-3LA METALLURGICAL LITERATURE CLASSIFICATION

**Solutions of polymers with linear structure. I. Influence of volumetric thermal expansion on the viscosity of solutions.** II. V. Kuvshinski (Phys.-tech. Inst., Acad. Sci., Leningrad). *J. Tech. Phys. (U.S.S.R.)* 14, 749-56 (1944).—When conclusions on the length and rigidity of polymer molecules are derived from the temp. coeff. of the intrinsic viscosity, this coeff. should be calcd. for a const. vol. concn. (mols. per l. at the test temp.). The coeff. calcd. for a const. wt. concn.  $c$  (mols. per kg.) differs increasingly from the correct one, the more the relative viscosity  $\eta$  varies with concn. A convenient equation for  $c$  and  $\eta$  is  $\log \eta = a_1 + b_1 c^2$ . II. Temperature dependence of viscosity. K. V. Kuvshinski and N. I. Khishkin. *Ibid.* 757-62.—The relative viscosity of polymer solutions at a const.  $c$  and different temps. is expressed by  $\log \eta = \log a + n \log \eta_0$ ,  $\eta_0$  being the viscosity of the solvent at the test temp., and  $a$  and  $n$  constants. From the expts. of K. and S.  $n$  is 0.0 for polyisobutylene in spindle oil, 0.041 for butadiene rubber in machine oil (both within the range 0-100°), 0.12 for butadiene rubber in kerosene (from -68° to 15°), 0.13 for 1% polystyrene in toluene (from -83° to 83°), 0.04 for 10% polystyrene in pyraline (from -64° to 48°), and 0.04 for polymethyl methacrylate in acetone (from -88° to 48°). The value of  $n$  is smaller, the greater the temp. coeff. of  $\eta_0$  of the solvent. The temp. coeff. of intrinsic viscosity calcd. for a const. vol. concn. is for these systems 0.0008, -0.0024, -0.0010, -0.0012, 0.0008, and -0.0012, resp. Except for polyisobutylene the polymer length decreases when temp. rises.

J. J. Bikerman

ASB-56A METALLURGICAL LITERATURE CLASSIFICATION

35. Synthesis. Reub. & others  
Prod.

1946

Particularities in the flow of solutions of high-molecular compounds. I. A. KRYSHINSKY (Trudy Akademii Vysokomolekulyar. Soedineniyam, Akad. Nauk S.S.S.R., (Indel. Khim. Nauk i Otdel. 1. Mat. Nauk, 1913, 1945, 1, 11-12; Chem. U.S.S.R., 1946, 44, 266). Dilute solutions of polymers with molecular weight less than 100,000, and more concentrated solutions of polymers with molecular weight below 15,000, differ from normal solutions

by showing abnormal viscosities and greater relaxation times. These factors cause anomalous effects in the form of gaseous or liquid droplets enclosed in the solutions and flowing with them, or when the solutions flow through narrow openings.

35-34651

C. A.

Theory of the evaporation of a liquid in a closed vessel.  
H. V. Kuvshinski (Leningrad Phys. Tech. Inst.). *Zhur.*  
*Tekhn. Fiz.* 17, 1358-8 (1947).—The solution of the one-  
dimensional problem of evapn. in an infinite cylindrical  
vessel, against a column of gas exerting a pressure on the  
liquid at the bottom, is applicable to the initial stage of  
evapn. in a vessel of finite height. The solution permits  
calc. of the max. possible cooling of the liquid surface.  
N. Tson



C. O.  
1951

General and Physical Chemistry  
2.

Evaporation of liquids in closed vessels II V. A. Liff-  
V. Kuvshinski, and N. M. Melnikov. *J. Tech. Phys.*  
*U.S.S.R.* 18, 541-4 (1948). - An equation was derived for  
the evapn. of a liquid from the bottom of a vertical cylindrical  
tube originally filled with pure gas. The pressure increased  
in the 1st stages according to the equation  $\Delta B = B - B_0 =$   
 $2.56 D \sqrt{D t / V}$ , where  $B$  is the pressure in atm., at begin-  
ning of evapn.,  $D$  is the diffusion coeff. in sq. cm. per sec.,  $t$   
is the time in sec.,  $S$  is the cross-section of tube in sq. cm. and  
 $V$  is the vol. of tube in cc. This equation is tested for evapn.  
of benzene in air in a closed vessel, and for  $\text{CCl}_4$  in  $\text{N}_2$ . The  
exp. is described and in both cases the evapn. follows the  
above equation closely in the initial stages. II A

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Empirical relations between the diffusion coefficients of vapors in different gases. N. V. Kargin. *Zhur. Tekh. Fiz.* 18, 908-14 (1948).—The formula for the diffusion coeff. of a gas  $s$  in a gas  $y$ ,

$$D_{sy} = B \sqrt{(1/M_s) + (1/M_y)} T^{1/2} / (V_s^{1/3} + V_y^{1/3})^2 P$$
  
(where  $M$  = mol. wt.,  $V$  = mol. vol.), simplified from the gas-kinetic theoretical formula, gives the relatively best agreement with exptl. data with  $B = 0.0113$ , but even so deviations attain 20-30%. If  $B$  is given its theoretical value, it is necessary to assume that the kinetic radii  $r$  are by 30-100% greater than the radii calcd. from  $V$ . An additivity formula of the type  $(r_s + r_y) = (r_s + r_x) + A$ , with  $A$  independent of the nature of  $x$ , is confirmed by data for about 40 org. vapors ( $x$ ) in the pairs  $y = \text{CO}_2$ ,  $s = \text{air}$ ;  $y = \text{CO}_2$ ,  $s = \text{H}_2$ , and  $y = \text{H}_2$ ,  $s = \text{air}$ . The sums of the kinetic  $r$  of the same pair of substances in different gases differ, with few exceptions, only by a const. Further empirical relations are  $D_{s1} = 0.183 + 0.65 D_{s2}$ ,  $D_{s1} = 0.175 D_{s2}$ , and  $D_{s1} = 0.008 + D_{s2}$ , where subscripts 1, 2, and 3 refer to  $\text{CO}_2$ , air, and  $\text{H}_2$ , resp. These relations permit, for example, the calcn. of  $D$  of  $\text{CCl}_4$  vapor in air and in  $\text{CO}_2$ , when only its  $D$  in  $\text{H}_2$  is known. They further permit the calcn. of the unknown  $D$  of self-diffusion of  $\text{CO}_2$  in  $\text{CO}_2$ , from the known  $D$  of  $\text{CO}_2$  in  $\text{H}_2$ , and  $D$  of  $\text{CO}_2$  in air, giving the very close values of 0.0025 and 0.0024 cc./sec. Hence, the kinetic radius for  $\text{CO}_2$  = 2.3 Å., and, further, from the additivity relations,  $\text{H}_2$  = 1.2 and air = 1.6 Å. If these relations are generally valid, and theoretically substantiated, then  $D_{sy} \approx \sqrt{D_{s1} D_{s2}}$ . N. Thon

2

CA

Determination of the coefficients of diffusion of vapors of cyclohexane, chloroform, and acetone, into air. N. A. Goryunova and R. V. Kuvshinov (Leningrad Phys.-Tech. Inst.). *Zhur. Tekh. Fiz.* 18, 1421-8 (1948). — The diffusion coeffs.  $D$  were detd. by the 2nd method of Stefan (*Ann. d. Phys. Chem.* 41, 723 (1890)); Leblanc and Wapperman, *C. R.* 10, 1462 by measurements of the rate of evapn. of the liquid through a long cylindrical tube into air. Under conditions of absence of convection, sufficiently long tube, and zero concn. of the vapors at the open end of the tube,  $D = (RT/Mp_a)(L/S)((dg/dt)/\ln p_a/(p_a - p_v))$ , where  $M$  = mol. wt.,  $p_a$  = atm. pressure in mm. Hg,  $L$  = length,  $S$  = cross-section of the tube,  $dg/dt$  = wt. rate of evapn. (in g./sec.),  $p_v$  = vapor tension of the liquid. The exact value of the app. const.  $L/S$  (82.7 cm.<sup>-1</sup>) was detd. by measurements with  $C_2H_6$  and  $Et_2O$  which gave values in good agreement with accepted data. The results of the measurements are: cyclohexane at 45°,  $D = 0.086 \pm 0.013$  cm.<sup>2</sup>/sec.;  $CHCl_3$  at 0° =  $0.091 \pm 0.012$ ;  $Me_2CO$  at 0°,  $D = 0.100 \pm 0.009$ . N. Thon

CA

Determination of the molecular weights of polymers formed at different stages of polymerization. Polymerization of styrene in the presence of quinone. R. V. Kuvshinski and R. V. Melikhina (Acad. Sci., U.S.S.R., Leningrad). *Zhur. Fiz. Khim.* 26, 199-201 (1950). — The characteristic viscosity of the polymer forming when the percentage polymerized increases from  $x$  to  $x + dx$  is given by  $[\eta] = [\eta] + x d[\eta]/dx$ ;  $[\eta]$  is the characteristic  $\eta$  of the mixt. at  $x\%$  polymerized. The equation shows, e.g., that, when  $d[\eta]/dx$  is const., the mol. wt. of the polymer is independent of  $x$ , contrary to Goldfinger, *et al* (C.A. 38, 10459).

J. J. Hukerman

31

CA

Kinetics of polymerization of styrene under pressures up to 6000 kg./sq. cm. P. P. Kobeko, B. V. Kurshinski, and A. S. Semenov (Polytech. Inst., Leningrad). *Zhur. Fiz. Khim.* 24, 315-321 (1950). The contraction due to polymerization of 1 g. styrene was almost independent of the degree of polymerization and of temp. (62-132°) but decreased when pressure  $P$  increased from, e.g., 0.21 cc. at 1 kg./sq. cm. to 0.17 cc. at 1000 and 0.11 cc. at 6000 kg./sq. cm. The rate of contraction (that is also the rate of polymerization) was purely reproducible except in the beginning of every expt. when it was const. (r). This  $r$  increased with  $P$  more steeply the lower the temp., thus,  $r$  at  $P = 6000$  was 23 and 55 times that at  $P = 1$  at 70° and 127°, resp. The energy  $V$  of activation was smaller the greater  $P$ . The preexponential factor in the Arrhenius equation was proportional to exp.  $(-1/RT)$  as in other reactions at high pressures. I. I. Birkman

CA

Molecular weights of polystyrene obtained under a pressure up to 6000 kg./cm.<sup>2</sup>. P. P. Kozlov, R. V. Kuvshinskii, and A. S. Semakova (Polytech. Inst. Leningrad). *Zhur. Fiz. Khim.* 24, 418-19 (1950). From literature data (cf. Vereshchagin, et al., C.A. 41, 6424b), the concn. dependence of the viscosity  $\eta$  of polystyrene (b) polymerized at 6000 kg./cm.<sup>2</sup> is identical with that of (a) polymerized at atm. pressure. The degree of polymerization  $n$  calculated from  $\eta$  decreases when temp.  $T$  increases according to log  $n = -0.49 + 7270/2.3RT$ , and is independent of pressure. J. J. Likierman

CA

Dilatometric method of studying the polymerization kinetics at high and ultrahigh pressures. N. V. Kuvshinshil and A. B. Semenova (Polytech. Inst., Leningrad). *Zhur. Fiz. Khim.* 24, 420-6 (1980).—The monomer is placed in a Pb ampul immersed in glycerol (for pressures below 2000 atm.) or kerosene (for higher pressures) contained in a steel cylinder in which a plunger moves. Constant pressure is applied to the plunger, and its movement caused by polymerization reaction is magnified by a dial instrument. The vol. change of the ampul does not alter the temp. equil. of the reaction. The pressure gauge is kept at a given temp., thus increasing the precision. The shifts of the plunger caused by pressure and temp. changes independent of polymerization are calculated. J. J. H.

9934. Equations of motion of an incompressible elasto-viscous medium. B. V. Kuvshinov. *J. Exp. Theor. Phys., USSR*, 21, 68-72 (Jan., 1951) (In Russian)

On the basis of two equations expressing the rheological laws of an incompressible elasto-viscous medium (Rayner-Ten lectures on theoretical rheology) derived according to Maxwell's hypothesis, equations are derived for the motion of such a medium. An analysis is made of cases where these equations can be simplified. The analysis shows that for small stresses, where only the linear rheological law applies, the elasticity of the medium manifests its characteristic form only for unsteady processes. In the case of steady flow, with certain reservations, the elasto-viscous medium is displaced according to the laws of the hydrodynamics of viscous liquids.

W. MOUTERS

W. MILLER

410 110 METALLURGICAL LITERATURE CLASSIFICATION



KURSHINSKY, Y. I.

Chemical Abst.  
Vol. 48 No. 9  
May 10, 1954  
General and Physical Chemistry

The work by Q. M. Bartenev on the thermodynamic  
theory of rubber elasticity. E. V. Kurshinski Colloid  
J. (U.S.S.R.) 14, 251-2 (1952) (Engl. translation). --See  
C.A. 46, 8472b. H. L. H.

3  
① Nov

ME  
9-11-54

KUVSHINSKIY Ye. V.

TRELOAR, L.; KUVSHINSKIY, Ye. V. [translator]; GUROV, K. P., redaktor;  
GERASIMOVA, Ye. S., tekhnicheskiy redaktor

[The physics of rubber elasticity] Fizika uprugosti kauchuka.  
Perevod s angliyskogo pod red. E. V. Kuvshinskogo. Moskva, Izd-vo  
inostrannoi lit-ry, 1953. 240 p. [Microfilm] (MLRA 7:10)  
(Rubber) (Elasticity)

KUVSHINSKIY, Ye V.

106. Mechanical properties of polymers in the softening region. Elongation diagrams of raw and vulcanised rubbers. N. A. Yezhov and E. V. Kuvshinskiy. *Zhur. Tekh. Fiz.*, 1953, 23, 1343-9; *Chem. Abn.*, 1955, 49, 4320; *Rubb. Chem. Technol.*, 1956, 29, 718-24. Natural rubber and polybutadiene rubber were stretched at temperatures in the range  $-100^{\circ}$  to  $+20^{\circ}\text{C}$ , and at rates of deformation of 0.05 to 2.5%/sec. From the experimental data curves are constructed for  $f=f(\lambda)$  and  $\sigma=\sigma(\lambda)$ , where  $f=F/s_0$  ( $F$ —stress,  $s_0$ —cross-section),  $\lambda=l/l_0$  (relative extension of the initial length  $l_0$ ),  $\sigma=F/V$ . The  $\sigma$  curves are regular for butadiene rubber at temperatures  $\theta \geq -42^{\circ}\text{C}$ , and they are steeper at lower temperatures; below  $-42^{\circ}\text{C}$  a peak appears on the initial part of the curve. Similar peaks are observed in natural rubber and in other plastics. 631371

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KUVSHINSKIY, Ye.V.

Adiabatic stretching as a method of investigation of the nature of elasticity of rubberlike materials. M. P. Votknov and Ye. V. Kuvshinskiy, *Zhur. Tekh. Fiz.* 34, 2157-63, (1966). Curves are presented for the adiabatic expansion of a pure butadiene-acrylonitrile polymer, starting at 1.5 and 1.8°, and for a chlorobutadiene rubber, starting with samples at 0, 18, and 93°. It is concluded that this is a good method to study the nature of elasticity for various kinds of deformation forces. Cryst. polymers show S-shaped curves; noncryst. ones do not. W. Jacobson

2 May

31

pm A

*Kuvshinskiy, Ye. V.*

D-9

USSR / Physics of High Molecular Substances.

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 9111

Author : Kuvshinskiy, Ye. V., Sidorovich, Ye. A.

Title : Type KS Pendulum Elastometer

Orig Pub : Zh. tekhn. fiziki, 1956, 26, No 4, 878 - 886

Abstract : A pendulum elastometer was developed for the study of the elastic properties of rubber at temperatures ranging from 20 -- 120° under the conditions of impact compression lasting for 0.01 -- 0.1 seconds. The instrument permits the tested rubber to be characterized in terms of the magnitude of its rebound elasticity, the magnitude of the dynamic modulus of elasticity, and also the specific mechanical losses referred to the square of the average stress, and the specific mechanical losses referred to the square of the maximum deformation.

Card : 1/1

KUVUSHINSKIY, Ye.V.

The design origin of poly(methyl methacrylate) destruction surfaces. G. A. Lebedev and E. V. Kuvushinskiy. Doklady Akad. Nauk S.S.S.R. 102, 1096-7(1956). -- Destruction of poly(methyl methacrylate) surfaces were studied with an interference microscope. The destruction was localized in definite specimen sections by lateral cuts with razor blades, 0.1-0.3 mm. deep, and the samples were slowly stretched at 40° to the destruction of the samples. The interference microscope photographs are reproduced.

W. M. Sternberg

Matt's

Inst. High Molecular Compounds, AS USSR



RESEARCH, L. A., 1977, 1978, ...

"Elastic properties and crystallization stresses," a paper presented  
at the 5th Congress on the Chemistry of Polymers of High Pressure, 2. 51 -  
2. 57, Moscow, Institute of High Pressure (Institute of High Pressure)

D-3, 014, 265





KUVCHINSKIY, L. V., and SHUKROV, S. I.

"Surface changes during degradation of amorphous polymers," a paper presented at the 5th Congress on the Chemistry and Physics of High Polymers, 2 Jan-2 Feb 77, Moscow, Polymer Research Inst.

B-3,974,005

BEVZENINSKIY, L. V., and JEMOVA, A. S.

"Polymerization of styrene under very high pressure," a paper  
presented at the 2nd Congress on the Chemistry and Physics of High Polymers,  
25 Apr - 2 Feb 57, Moscow, Organic Chemistry Research Inst.

B-3,604,305

120-1-26/57

AUVSHINSKIY, Ye. V.  
AUTHOR: Volodin, V. P., and Kuvshinskiy, Ye. V.

TITLE: Measurement of the Mechanical Dynamic Characteristics of Rubbers. (Izmereniye Mekhanicheskikh Dinamicheskikh Kharakteristik Rezin.)

PERIODICAL: Priory i Tekhnika Eksperimenta, 1957, No.2 , pp. 94 - 98 (USSR).

ABSTRACT: The authors give the description of an instrument similar to that proposed by Marvin, Fitzgerald and Ferry (Ref. 4), but more simple in construction and operation. It can be used to determine, in three independent ways, the dynamic modulus of elasticity and the angle of mechanical losses of rubbers in the frequency range 20-300c/s and in the temperature range -20 to 150°C under the conditions of deformation in axial compression and decompression. The instrument, a cross-section of which is given in Figure 1, uses a vibration generator type GKK-1 (ГКК-1), the necessary temperature being obtained by forcing either water or ethyl alcohol through the envelope for temperature range -10°C to 100°C. An electrical oven was used for temperatures above 100°C and the instrument was cooled by liquid nitrogen below -10°C. The temperature of the sample was measured by a constantan copper thermocouple with accuracy of 0.5°C. Differing from the

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12-2-20/57  
Measurement of the Mechanical Dynamic Characteristics of Rubbers.  
installation proposed by Marvin, Fitzgerald and Perry,  
two simpler bridge configurations were used (Figures 2  
and 3). The determination of the mechanical properties of  
the material as based on the Kelvin-Voigt model is also  
discussed. The cross sections of the instrument, two  
circuit diagrams of the two bridges, three graphs, two  
tables of numerical results and the equivalent electrical  
circuit diagram of the Kelvin-Voigt model are given.  
There are five references, two of which are Slavic.

SUBMITTED: November, 23, 1956.

ASSOCIATION: Leningrad Polytechnic Institute imeni M.I. Kalinin.  
(Leningradskiy Politekhnikheskiy Institut im. M.I. Kalinina)

AVAILABLE: Library of Congress.

Card 2/2

*Kuvshinskiy, Ye. V.*  
 120-5-21/35  
 AUTHORS: Volodin, V.P., and Kuvshinskiy, Ye.V.  
 TITLE: Determination of the Dynamic Mechanical Characteristics of Rubbers at Acoustic Frequencies (Opredeleniye mekhanicheskikh dinamicheskikh kharakteristik rezin v zvukovom diapazone chastot)  
 PERIODICAL: Pribory i Tekhnika Eksperimenta, 1969, No. 5, pp. 86 - 91 (USSR).

ABSTRACT: An installation has been developed for measuring the dynamic modulus of elasticity and mechanical loss angle within the frequency range 80 - 4 000 c.p.s. at temperatures from -20 to +120 °C under conditions of small displacement. Fig. 1 shows the main features in a block diagram, viz., the use of a capacitive pickoff for measuring displacement, the measurement of current in the moving coil as an indication of force, the use of a phasemeter to measure the angle between force and displacement. Fig. 2 is a cross-section through the complete assembly. The material to be tested is subjected as a number of isolators supporting a former made from walrus ivory (s.g. 1.95;  $E = 1.3 \times 10^{11}$  dynes/cm<sup>2</sup>) in the gap of a large electro-magnet. The former carries an exciting coil fed from an audio-oscillator type 3F-10. A micrometer enables a capacitive pick-off to be positioned under the moving system. The circuit which

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Determination of the Dynamic Mechanical Characteristics of Rubbers at Acoustic Frequencies.

converts the changes in capacitance into voltage has been described in principle (Ref.5) and also a practical version of the same (Ref.6). The conversion is linear with an error of less than 3% and gives a sensitivity (including the pre-amplifier) of  $10^5$  V/mm when the gap between the plates of the capacitor is 0.1 mm. The phasemeter is of the switching type described by Borman (Ref.9). It works best with an input in each channel of 20 V, a deviation of  $\pm 3$  V producing an error of less than 0.1%. The use of voltmeters at the appropriate points in the circuit guarantees a deviation of less than  $\pm 1$  V. The supply voltages are stabilized by ferro-resonant and electronic stabilizers. The main electro-magnet supply is separately stabilized at  $76 \pm 0.1$  mA. It is shown from the theory of the measurement that unless the size of the sample is chosen appropriately to the frequency and material constants, appreciable corrections are required. For example, when the magnitude of the elastic modulus is  $5 \times 10^7$  dynes/cm<sup>2</sup>, the frequency is 1 kc/s and the thickness of the sample is 0.1 cm, the correction is almost 15%. The experimentally determined relation between phase (force-displacement) and frequency differs from the one noted by

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120-5-21/35

Determination of the Dynamic Mechanical Characteristics of Rubbers  
at Acoustic Frequencies.

nearly all other authors using electro-dynamic methods. This topic is to be the subject of a separate article. Measurements were discontinued whenever the error exceeded 10%. Fig. 4 shows the variation of modulus and angle of loss ( $\tan \delta$ ) with frequency for a natural rubber at temperatures of  $-10^{\circ}\text{C}$  and  $75^{\circ}\text{C}$ . The shape factor of the sample,  $D$  (thickness divided by cross-sectional area) was  $1/40\text{ cm}^{-1}$ . The error in measuring the modulus and loss angle reached 25% at twice the frequency of mechanical resonance. Measurements were made on CKC-30A sulphur-vulcanized rubber by the present method and by two other methods; the "travelling-wave" and "force and velocity" methods. The table and Fig. 5 show that the agreement is quite satisfactory. The maximum force exerted by the vibrator was  $5 \times 10^7$  dynes at a coil current of 0.5 A. The flux density in the gap was 11 000 gauss and the moving mass was 13.8 g. The minimum recorded displacement was  $10^{-5}$  cm and the minimum angle between force and displacement  $1^{\circ}$ . The least measured  $\tan \delta$  was 0.02. The upper limit of hardness was  $2 \times 10^9$  dynes/cm. The lower limit of frequency was set by the phasemeter and card 3/4 could be reduced to 0.01 c.p.s. by using an H $\phi$ -2 in conjunction

120-5-21/35

Determination of the Dynamic Mechanical Characteristics of Rubbers  
at Acoustic Frequencies.

with an HF-2 oscillator. A.P. Rudakov and L.L. Sul'zhenko  
took part in the work. There are 5 figures, 1 table and  
10 referates, 5 of which are Slavic.

ASSOCIATION: Leningrad Polytechnical Institute imeni M.I.Kalinin  
(Leningradskiy politekhnicheskii institut im.  
M.I. Kalinina)

SUBMITTED: March 18, 1957.

AVAILABLE: Library of Congress  
card 4/4



K. KUVSHINSKY Ye. V.

120-5-33/35

AUTHORS: Votinov, M.P., and Kuvshinskiy, Ye.V.

TITLE: A "Reochord" Extensometer for the Determination of the Expansion of Rubber in Stretching Tests (Reokhordnyy ekstensometr dlya opredeleniya udlineniya rezin pri ispytaniyakh na rastyazheniye)

PERIODICAL: Priory i Tekhnika Eksperimenta, 1957, No.5, pp. 122-123 (USSR).

ABSTRACT: The principle of the extensometer and its construction is shown in Fig. 1. The specimen 1 is kept in position by means of the four knife edges 2. The knife edges are pressed against the specimens by means of a rubber band 5. Two blocks 3 made from electrically insulating material are placed on the ends of each of the knife edge carrying carriages. Nichrome wires 4 are let through holes in these blocks and are kept parallel to the direction of extension of the specimen. The resistance between the points A, B and C, D on the wires are measured by means of the DC bridge also shown on Fig.1. The off-balance current can be exhibited on the screen of a magneto-electric oscillograph, type MPO-2. A typical oscillogram is shown in Fig.2 and corresponds to a deformation at a rate of 100% per sec. in an extension-compression cycle. The extensometer may be used in the measurement of expansion when the rates of

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120-5-33/35

A "Reochord" Extensometer for the Determination of the Expansion of Rubber in Stretching Tests.

deformation are 100-400% per sec. and in the temperature range -15° to +85° C (Ref.1).

There are 2 figures and 2 Slavic references.

ASSOCIATION: Leningrad Polytechnical Institute imeni M.I. Kalinin  
(Leningradskiy Politekhicheskiy Institut imeni M.I. Kalinina)

SUBMITTED: March 26, 1957.

AVAILABLE: Library of Congress  
Card 2/2

120-6-23/36  
AUTHORS: Votinov, M.P., Kuvshinskiy, Ye.V., and Sul'zhenko, L.L.  
TITLE: A Device for Studying Thermoelastic Properties of Adiabatically-stressed Rubber (Ustanovka dlya izucheniya termoupravlyayemykh svoystv rezin v adiabaticheskikh usloviyakh rastyazheniya)  
PERIODICAL: Priroda i Tekhnika Eksperimenta, 1957, No.6, pp. 92 - 94 (USSR).

ABSTRACT: Two devices are described which can be used to study thermoelastic properties and "crystallisation" processes in resins using the method of adiabatic extension in the temperature range -20 to +100 °C and at different speeds of deformation. The first apparatus is shown in Fig.1 and the second in Fig.2. The aim of the present work was to eliminate, as far as possible, heat losses, and to increase the accuracy of temperature measurement during the process of deformation. It was established that thermal losses are mainly due to convection. They are particularly large at low speeds of deformation, i.e. when the duration of the process is up to 100 to 125 sec. Heat losses in the first device were eliminated by using a vacuum chamber evacuated to a pressure of  $10^{-2}$  to  $10^{-3}$  mm Hg. The elimination of heat losses meant that specimens with larger cross-sections could be used (100 mm<sup>2</sup>). Manganin-constantan

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120-6-23/26

A Device for Studying Thermoelastic Properties of Adiabatically-stressed Rubber.

thermocouples were used to measure the temperature. Since the thermal conductivity of manganin-constantan is lower by a factor of 15 than that of copper, the heat losses due to this source were also lowered (the diameter of the wires was 0.05 mm). These measures made it possible to lower the heat losses to 8%. In the second apparatus, it was not necessary to use a vacuum chamber and specimens of high area of cross-sections since in these experiments the duration of deformation was only 1.5 to 6 sec. The general heat losses at the end of a cycle calculated from cooling curves of extended specimens, did not in this case exceed 3 to 4%. The two devices are shown in Figs. 1 and 2. The extensions were measured by transforming them into electrical impulses using the off-balance current of a bridge. A similar scheme was used for the measurement of the stress. The mechanical work performed on the specimen could be estimated to an accuracy  $\pm 8\%$ . The apparatus was used to study deformation of resins and the results were reported by the present author in Refs. 8 to 10. There are 3 diagrams and 10 references, 5 of which are Slavic.

ASSOCIATION: Leningrad Polytechnical Institute, L.I. Kalinin  
(Leningradskiy Politehnicheskii Institut L.I. Kalinina)  
Card 2/3

120-6-23/36  
A Device for Studying Thermoelastic Properties of Adiabatically-  
stressed Rubber.

SUBMITTED: April 24, 1957

AVAILABLE: Library of Congress  
Card 3/3

KUVSHINSKIY, Ye. V. and LAZURKINA, Ye. S.

X2 "On the Qualities of Polymeric Glass and the Mechanics of Glass Formation of High Molecular Combinations"

Inter-vuz Scientific Conference (Mezhvuzovskiy nauchnyy konferentsii)

Vestnik Vysshey shkoly, 1957, # 9, pp. 73 - 76 \* (USSR)

Abst: In January 1957, the Second All-Union Conference on Photosynthesis took place, organized by the Institute of Plant Physiology of the Academy of Sciences, USSR, and by the Faculty of Soil-Biology of the Moscow University. About 700 representatives of 130 scientific-research institutes, vuzes and ministries were present. The introductory report was made by Academician A. L. Kursanov who described the development of photosynthesis during the last ten years and invited the scientists to concentrate their work on the application of radioactive and stable isotopes. Nearly 100 reports were read: 13 on photochemistry, 2 on the investigation of chloroplast structure, 19 on the investigation of pigments, 2 on the photosynthesis of water plants, bacteria, etc.

PA-2796

AUTHOR:  
TITLE:

KUVSHINSKIY, YE.V., SIDOROVICH, YE.A.  
Influence of Vulcanization on Dynamic Elastic Properties of Rubber.  
(Vliyaniye vulkanizatsii na dinamicheskiye elasticheskiye svoystva  
rezin, Russian.)

PERIODICAL:

Zhurnal Tekhn. Fiz., 1957, Vol 27, Nr 4, pp 702 - 706 (U.S.S.R.)  
Reviewed: 6 / 1957  
Received: 5 / 1957

ABSTRACT:

From smoked sheets and from synthetic polyisopren - butadien + sodium -,  
divenyl - styrol and divenyl - nitril caoutchoucs a series of crude  
rubber samples was prepared, which differed in their degree of vul-  
canization. In order to obtain this effect, the contents of sulphur  
and of catalyzer substance varied as well as temperature and the time  
of vulcanization. The dependence of the dynamic characteristics of  
rubber samples with different degrees of vulcanization can be ex-  
plained on the basis if these investigations in the following way:  
The chains of the vulcanized substance are interconnected by firm  
chemical and somewhat weaker physical bindings thus forming a net-  
work. With increasing temperature the number and rigidity of the lat-  
ter decreases considerably. The bounce-elasticity, on the other hand,  
increases, at the expence of increase of the flexibility of the  
chains, whereas a rise in temperature leads to a weakening and reduction  
of the number of physical bindings, which implies a reduction of the  
total number of chained domains which give the network its elasticity,  
and produces an increase of the number of chains which have lost their

Card 1/2

PA-2796

Influence of Vulcanization on Dynamic Elastic Properties of Rubber.

connection with the network except at one end. Those chains slow down the motion of the elastic elements and diminish elasticity. In the same way the change of the dynamic Young's modulus with temperature can be explained. The properties of crude rubber samples originating from the same raw material are determined by the density of the vulcanizing network. A control of the conditionally balanced modulus makes it possible to obtain rubber with different characteristics which can be determined beforehand by means of the variation of recipes and of the conditions of vulcanization. The entire test takes only 20 min. (With 7 illustrations, 1 table and 4 citations from Slav publications).

ASSOCIATION: Not given  
PRESENTED BY:  
SUBMITTED: 26.9.1956  
AVAILABLE: Library of Congress

Card 2/2



GARBUZOV, Andrey Ignat'yevich, dotsent; MISHIN, Vasil'y Porfir'yevich,  
dotsent; TILE, Vera Karlovna, assistant; KUVSHINSKIY, M.N.,  
red.; ZUYEVA, M.K., tekhn.red.

[Semimicro qualitative chemical analysis] Kachestvennyi  
khimicheskiy polumikroanaliz. Moskva, Gos.izd-vo med.lit-ry.  
1960. 230 p. (MIRA 13:5)  
(Chemistry, Analytical--Qualitative)

AUTHOR: KUVSHINSKIY, Ye. V., FOMICHEVA, M. M. PA - 3556  
 TITLE: Influence of Rubber Molecular Weight on its Mechanic Properties.  
 (Vliyaniye molekulyarnogo vesa kauchuka na dinamicheskiye  
 mekhanicheskiye svoystva rezin, Russian)  
 PERIODICAL: Zhurnal Tekhn. Fiz. 1957, Vol 27, Nr 5, pp 1019-1028 (U.S.S.R.)  
 ABSTRACT: At temperatures of 20, 60 and 100° C the modifications of the  
 elasticity modulus and of the rebounding of rubber of fractions  
 of divinylstyrol caoutchouc SKS-30-A were investigated in an  
 interval of molecular weights of 45 000 to 620 000 with different  
 vulcanization depths (in the case of a modification of the con-  
 ditionally balances modulus from 5 to 70 kg/qcm). The dynamic  
 elasticity modulus at room- as well as at increased temperature  
 depends only little on the molecular weight of the initial  
 caoutchouc. At higher temperatures the elasticity of rubber is  
 mainly determined by the depth of vulcanization. As a measure the  
 conditional balanced modulus may serve. At low temperatures (20° C)  
 elasticity grows with the depth of vulcanization, but in the case  
 of rubbers made from fractions of different molecular weights  
 this growth differs as to extent. At 20° C the increase of  
 vulcanization depth increases the elasticity of rubbers of low

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molecular fractions (45 000) less than in the case of those of high molecular fractions (more than 133 000). The amount of maximum elasticity of rubbers obtained from caoutchoucs of the same molecular weights does not depend on the character of the accelerator used. (With 5 Tables, 6 Illustrations, and 7 Slavic References).

ASSOCIATION: VNIISK, Leningrad  
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*Kuvshinskiy, Ye. V.*

AUTHORS: Votinov, M. P., and Kuvshinskiy, Ye. V. 57-10-15/33

TITLE: Thermoelastic Phenomena in Synthetic Rubbers at Adiabatic Deformation Reaching the Break (Termouprugiye yavleniya v rezinakh iz SKS-30A i SKB pri adiabaticheskom deformirovani do razryva).

PERIODICAL: Zhurnal Tekhn. Fiz., 1957, Vol. 27, Nr 10, pp. 2303-2306 (USSR).

ABSTRACT: On the strength of the investigations given here following can be said. 1) The expansion of the vulcanisates SKS-30A and SKB reaching the break is accompanied by a heat development equivalent to the tension work, a fact which points out the kinetic nature of the elastic forces in these vulcanisates. 2) An alteration of the vulcanization process of a mixture and the introduction of a filler leads only to an alteration of the rubber elasticity modulus. The accor= dances to a rule in the transformation of work into heat are not affected with it. The lacking of the crystallization processes even in important tensions ( $\lambda \approx 6 \div 7,5$ ) is obviously determined in the first place by the irregular construction of the hydrocarbon skeleton of the final caoutchoucs. 3) In the case of rubbers with active fillers which were obtained under optimum conditions by vulcaniza=

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